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NOISE AND VIBRATION

Draft Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Carrizo Energy Solar Farm (CESF), if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the affected area, directly or indirectly. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that combined with the staff's proposed conditions of certification would avoid any significant adverse impacts.

In considering the CESF's contribution to cumulative impacts, staff has examined the potential combined noise impacts of the CESF and the proposed Topaz Solar Farm (TSF), a photovoltaic solar power plant to be located immediately to the west, north, and east of the CESF site. Based on the relative quietness of the technology proposed for the TSF, staff believes the CESF in combination with the TSF project is not likely to create significant cumulative impacts. However, staff proposes Conditions of Certification **NOISE-2** and **NOISE-10** to ensure that the CESF's contribution to cumulative impacts is not cumulatively considerable. (For further discussion, please see **Cumulative Impacts and Mitigation**.)

SunPower California Valley Solar Ranch project would be located at least 6 miles away from the CESF site, too far to cause cumulative noise impacts when combined with the CESF project.

In this FSA, staff uses the same existing ambient noise levels used in the PSA to evaluate the project's noise impacts. These levels are the results of the data gathered by staff in its September 2008 noise survey.

Based on the staff's evaluation of the Draft Noise Mitigation Plan (DNMP), staff believes that construction impacts at the project's most noise-sensitive receptors can be mitigated to less than significant by employing practical and effective mitigation measures such as those listed in the DNMP. Employment of equipment engine noise suppression upgrades or installation of construction noise barriers, or both, as described in the DNPM and as required by Condition of Certification **NOISE-7**, and the implementation of Conditions of Certification **NOISE-1**, **NOISE-2** (noise complaint resolution process), **NOISE-6** (restriction on hours of construction and disallowing unnecessary noise), and **NOISE-8** (steam blow noise limits) will ensure that construction activities will create less than significant impacts at the noise-sensitive receptors.

The DNMP offers several practical and effective mitigation measures to reduce the noise impacts of the project's nighttime maintenance activities. Employment of the electric-powered reflector cleaning crew vehicle described in the DNPM (instead of the conventional internal-combustion-powered vehicle proposed in the AFC) as required by

PROOF OF SERVICE (REVISED 6/5/09) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 6/22/09
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Condition of Certification **NOISE-9** and the implementation of Conditions of Certification **NOISE-1**, **NOISE-2** (noise complaint resolution process), and **NOISE-4** (nighttime noise level restrictions at the noise-sensitive receptors) will ensure that the nighttime maintenance activities will create less than significant impacts at the noise-sensitive receptors.

In light of the mitigation options listed in the DNMP and the proposed conditions of certification, staff believes the noise impacts of the project's construction and maintenance activities will be mitigated to less than significant.

Although the applicant's latest noise modeling shows the project's operational noise impacts to be less than significant at the project's noise-sensitive receptors, staff has not fully relied on the applicant's modeling in concluding that the project will not create significant adverse impacts.

The proposed conditions of certification include a noise complaint resolution process for operation (**NOISE-2**) and operational noise limits at the affected receptors (**NOISE-4**).

To ensure the effects of temperature inversion, or other weather-related conditions that could result in elevated noise levels, will be captured, staff, in Condition of Certification **NOISE-4** recommends the ambient noise survey to be performed during two different times of the year, once during a cold and cloudy day, to capture the effects of inversion, and once during a late spring, summer, or early fall day, to capture the potential effects of other weather-related conditions. If either survey shows noncompliance, Condition of Certification **NOISE-4** will require the applicant to employ additional mitigation measures. Additionally, Condition of Certification **NOISE-2** will allow for a complaint resolution process for up to one year after the project has become operational.

Staff has successfully used the methods described in these conditions of certification in numerous past power plant projects and is confident they will be adequate to resolve any potential noncompliance-related issues for the CESF.

INTRODUCTION

The construction and operation of any power plant creates noise or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The groundborne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the CESF project and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated and would comply with applicable laws, ordinances, regulations and standards

(LORS). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal:	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
U.S. Environmental Protection Agency (U.S. EPA)	Assists state and local government entities in development of state and local LORS for noise
State:	
California Occupational Safety & Health Act (Cal/OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local:	
San Luis Obispo County General Plan, Noise Element	Establishes acceptable noise levels.
San Luis Obispo County Land Use Ordinance, Noise Ordinance	Establishes acceptable noise levels and limits hours of construction.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration, (OSHA) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A**, **Table A4**, immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Guidelines are available from the U.S. Environmental Protection Agency (U.S. EPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the U.S. EPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the *vibration level*, which is calculated from the peak particle velocity measured from groundborne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (dBA).

The California Occupational Safety and Health Administration (Cal/OSHA) has promulgated occupational noise exposure regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

The CESF project site and the project's noise-sensitive receptors are located within an unincorporated area of San Luis Obispo County. Therefore, the Noise Element of the San Luis Obispo County General Plan (SLOC 2008e) and the Noise Ordinance of the San Luis Obispo County Land Use Ordinance (SLOC 2004) apply to this project.

San Luis Obispo County General Plan, Noise Element

The Noise Element of the San Luis Obispo County General Plan limits noise levels from stationary noise sources to 50 dBA L_{eq} (hourly average) during the daytime hours of 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} during the nighttime hours of 10:00 p.m. to 7:00 a.m. at the property line of a noise-sensitive receptor (SLOC 2008e). These limits, as specified in Table 3-2 of the noise element, are summarized in **Noise Table 2** below. These requirements apply to operational noise and not to construction noise.

Noise Table 2:
San Luis Obispo County Exterior Noise Limits dBA (L_{eq})

Category	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Residential	50	45

Source: SLOC 2008e, Table 2-3; SLOC 2004, §23.06.042; AFC §5.12.5.3.2, Table 5.12-8

San Luis Obispo County Land Use Ordinance, Noise Ordinance

Similar to the above noise element, the Noise Ordinance of the San Luis Obispo County Land Use Ordinance limits noise levels from stationary noise sources to 50 dBA L_{eq} during the daytime hours of 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} during the nighttime hours of 10:00 p.m. to 7:00 a.m. at the property line of a noise-sensitive receptor (SLOC 2004). These limits, as specified in section 23.06.044 of the noise ordinance, are summarized in **Noise Table 2** above.

Section 23.06.042 of this ordinance exempts construction noise from compliance with the above requirements if construction is limited to between the hours of 7:00 a.m. and 9:00 p.m. Mondays through Fridays or 8:00 a.m. and 5:00 p.m. on Saturdays and Sundays.

SETTING

The proposed CESF project site is located west of Simmler and northwest of California Valley, in unincorporated San Luis Obispo County, California. The land use designation of the project site is agricultural (see **Noise Figure 1**). The immediate project area consists of primarily disturbed ranchland, with some residential uses. Sources of noise in the area include vehicle traffic on California State Route 58 (SR-58), natural sounds (birds, insects, dogs, cows, and rustling leaves), and occasional aircraft over flights (CESF 2007a, AFC §5.12.1.2).

Sensitive noise receptors[1] in the vicinity of the project include single-family residences and an elementary school.

[1] A *sensitive noise receptor*, also referred to as a *noise-sensitive receptor*, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA's guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item 3, above, to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by more than 5 dBA at the nearest sensitive receptor.

Staff has concluded that an increase in background noise levels up to and including 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however, is clearly significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level;[2]

[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions.

2. the duration and frequency of the noise;

3. the number of people affected; and

4. the land use designation of the affected receptor sites.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[3] activities are limited to daytime hours.

Staff uses the above method and threshold to protect the most sensitive populations.

Applicant's Ambient Noise Monitoring (not used in this analysis)

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (CESF 2007a, AFC §5.12.1.2, Table 5.12-2, Figure 5.12-1). This survey was performed from Wednesday, June 13 through Thursday, June 14, 2007, using acceptable equipment and techniques.

Weather during the survey was relatively mild. Wind speeds of 0 to 15 mph were observed during the day, but winds were calm at night and in the early morning. The sky was relatively clear, and humidity was relatively low.

The noise survey monitored existing noise levels at the following five locations, shown in **Noise Figure 2**:

1. Location ML1: Located between two residences at 8710 SR-58 and 8770 SR-58, approximately 7,216 feet southwest of the center of the project's power block. This location represents two of the nearest existing residential receptors to the west of the project site. This location was monitored from 2:29 a.m. to 2:44 a.m., and again from 3:44 p.m. to 3:59 p.m., on June 14, 2007.

2. Location ML3: Located at 9368 SR-58, approximately 6,317 feet northeast of the center of the project's power block, representing one existing residential receptor. This location was monitored only during the daytime from 7:43 p.m. to 7:58 p.m. on June 13, 2007.

[3] Noise that can potentially draw legitimate complaints.

3. Location ML7: Located approximately 89 feet south of SR-58 in a parking lot between a residence and a San Luis Obispo County office building. This location is approximately 2.7 miles southeast of the project site. This location was monitored from 4:40 a.m. to 4:55 a.m., and again from 5:08 p.m. to 5:23 p.m., on June 14, 2007.

4. Location LT1: Located at the yard of the Carrisa Plains School, approximately 9,348 feet southeast of the center of the project's power block. This location was monitored continuously from 5:00 p.m. on June 13, through 7:00 p.m. on June 14, 2007.

5. Location SR10: Located near a residence, approximately 1,400 feet west of the project's western boundary. The applicant did not report the date(s) and time(s) of the measurements in the AFC.

As explained above, the noise environment in the vicinity of the project site is dominated by transportation-related and natural sources.

Noise Table 3 summarizes the results of the above ambient noise survey (CESF 2007a, AFC §5.12.1.2; Tables 5.12-2, 5.12-3).

Noise Table 3
Summary of Measured Noise Levels

Measurement Sites	**Measured Noise Levels, dBA**	
	15-Minute Measurement During Nighttime (10:00 p.m. – 7:00 a.m.) L_{eq}	**15-Minute Measurement During Daytime (7:00 a.m. – 10:00 p.m.) L_{eq}**
ML1, Residence at 8710 SR-58	43	35
ML3, Residence at 9368 SR-58	Not Recorded	46
ML7, Residence approximately 2,700 feet east of Soda Lake Road, southeast of project site	43	49
SR10, Residence approximately 1,400 feet west of the project site's western boundary	43	35
	Average During Daytime Hours (7:00 a.m. – 10:00 p.m.)[1] L_{eq}	
LT1, Carrisa Plains School	47	

Source: CESF 2007a, AFC §5.12.1.2; Tables 5.12-2, 5.12-3
[1] AFC Table 5.12-3 and staff calculations of average noise levels during measurement period (see Noise Appendix A)

The above noise survey measured the ambient noise levels at ML3 for only 15 minutes between 7:43 p.m. and 7:58 p.m. The survey did not record the daytime ambient noise levels. In order to evaluate the project's noise impact at ML3, staff needed to better understand the existing noise environment at this location. Therefore, staff requested that the applicant measure the ambient noise level at this location during two different times of a 24-hour period, in the morning and in the afternoon. The applicant measured the noise in the morning, in the afternoon, and at night. **Noise Table 4** summarizes these measurements (CESF 2008f).

Noise Table 4
Summary of Applicant Measured Noise Levels at ML3

Measured One-Hour Noise Levels, dBA	
Nighttime Hour L_{eq}	**Average During Daytime Hours[1] L_{eq}**
54	45

Source: CESF 2008f, Data Response 81
[1] Data Response 81 and staff calculations of average noise levels (see Noise Appendix A)

At the public workshops held for the CESF project, some members of the public stated that they believed the noise survey described in the AFC, which was performed in June 2007, did not measure the ambient noise levels at all of the existing and planned residential receptors near the project site. Therefore, staff asked the applicant to identify all new residences built since June 2007, and all planned residential developments, within the 3-mile radius of the center of the project site. Staff also asked the applicant to conduct a short-term (one-hour) ambient noise survey at these locations during calm weather conditions and provide the resultant noise levels to staff.

The applicant identified three residences labeled Strobridge, Bell Future (to be built), and Bell Existing, shown in **Noise Figure 3** (CESF 2008f). The applicant also measured the ambient noise levels at these locations during three different times of a 24-hour period, in the morning, in the afternoon, and at night, as requested by staff. As recorded in this survey, with the exception of wind speed of up to 15 miles per hour during the afternoon measurements at Bell Existing and Bell Future, the weather conditions were calm during the period of the survey.

These newly identified locations are described below.

1. Location Strobridge: APN 072-051-026, approximately 3,230 feet north of the center of the project's power block. This location represents a house which is being built and is expected to be occupied prior to the start of project construction. This location was monitored from 3:15 p.m. to 4:15 p.m. on June 3, from 12:30 a.m. to 1:30 a.m., and again from 8:50 a.m. to 9:50 a.m. on June 4, 2008.

2. Location Bell Future: APN 072-301-001, approximately 10,207 feet west of the center of the project's power block. This location represents a house which is being

built and is expected to be occupied prior to the start of project construction. This location was monitored from 6:00 p.m. to 7:00 p.m., and again from 11:00 p.m. to 12:00 a.m. on June 4, and from 8:10 a.m. to 9:10 a.m. on June 5, 2008.

3. Location Bell Existing: APN 072-311-004, approximately 12,356 feet west of the center of the project's power block. This location represents an existing residential receptor. This location was monitored from 4:50 p.m. to 5:50 p.m. on June 4, from 12:15 a.m. to 1:15 a.m. and again from 7:00 a.m. to 8:00 a.m., on June 5, 2008.

Noise Table 5 summarizes these measurements (CESF 2008f).

Noise Table 5
Summary of Applicant-Measured Noise Levels at Newly Identified Receptors

Measurement Sites	Measured One-Hour Noise Levels, dBA	
	Nighttime Hour L_{eq}	Average During Daytime Hours[1] L_{eq}
Strobridge	35	44
Bell Future	28	39
Bell Existing	32	39

Source: CESF 2008f, Data Response 83
[1] Data Response 83 and staff calculations of average noise levels (see Noise Appendix A)

Staff's Ambient Noise Monitoring

At the August 5, 2008 Data Response Workshop, some of the residents living near the proposed project site expressed some concerns about the validity of the above measurements. In their opinion, the above surveys conducted by the applicant did not characterize the existing noise conditions. They requested that staff verify the survey by conducting its own survey. Staff did this (CEC 2008ae, Noise Survey Conducted by Brown-Buntin Associates, Inc.).

To better understand the existing noise environment within the project area, staff conducted long-term continuous measurements at four of the nearest monitoring locations, Strobridge, Bell Future, ML7, and Reyes (staff learned about this location just before conducting this survey). Additionally, staff conducted short-term (one-hour) measurements during three times of a 24-hour period at monitoring locations ML1, ML3, SR10, and LT1 (see **Noise Figure 3**). This survey was performed from Tuesday, September 23 through Thursday, September 25, 2008 (CEC 2008ae).

Weather during the survey was relatively mild, with observed nighttime temperatures in the range of 60 to 65 degrees Fahrenheit (°F), and daytime temperatures up to 90°F. Wind speeds of 5 to 15 mph were observed in the daytime from about 11 a.m. to

sunset, but wind speeds were 0-5 mph at night and early morning. The sky was clear, and humidity was relatively low.

For each of the measurement locations, the measurement times and the major sources of noise during the survey are described below (CEC 2008ae). Because typically during a long-term survey the measurement equipment is unattended, no one was present to record the sources of noise at the locations where long-term measurements were taken. For the locations of these receptors on a map, please see **Noise Figure 4** below.

1. Location ML1: Staff conducted one-hour measurements at this location from 10:00 p.m. to 11:00 p.m. on September 23, from 9:40 a.m. to 10:40 a.m., and again from 4:00 p.m. to 5:00 p.m. on September 24, 2008. The nighttime noise sources at this location included occasional vehicle traffic on SR-58, insects, coyotes, a nearby horse, and a jet flying overhead. During the morning hours, noise sources were primarily traffic, children playing nearby, and birds. The afternoon noise sources included wind in the trees, birds, traffic, and the resident driving by.

2. Location ML3: Staff conducted one-hour measurements at this location from 1:11 p.m. to 2:11 p.m. and from 10:00 p.m. to 11:00 p.m. on September 24, and again from 10:00 a.m. to 11:00 a.m. on September 25, 2008. During the afternoon, wind speed increased from zero to 12-15 mph in gusts. The noise sources included insects, especially flies and grasshoppers, and a bird. Goats and horses were observed nearby. At night, crickets were dominant, and the residents' voices could be heard. Horses ran in a nearby pasture, and a resident drove by. In the morning, there were no apparent noise sources except insects and birds. No traffic was present during the daytime measurements.

3. Location SR10: Staff conducted one-hour measurements at this location from 10:00 p.m. to 11:00 p.m. on September 23, from 9:30 a.m. to 10:30 a.m., and again from 3:55 p.m. to 4:55 p.m., on September 24, 2008. The nighttime noise sources included occasional vehicle traffic on SR-58, insects, coyotes, and a jet flying overhead. During the morning hours, the noise sources were primarily traffic and birds. The afternoon noise sources included wind in the trees, birds, and traffic.

4. Location LT1: Staff conducted one-hour measurements at this location from 11:05 a.m. to 12:05 p.m., from 2:35 p.m. to 3:35 p.m., and again from 10:00 p.m. to 11:00 p.m., on September 24, 2008. The morning noise sources included birds in the trees and children leaving classrooms for lunch. A classroom air conditioning unit operated periodically after about 11:50 a.m. The afternoon noise sources included the wind in the trees and the air conditioning unit. Two classes were in session, indoors. At night, the maximum noise levels were elevated due to proximity to the highway (SR-58). The nearby water tank pressure pump was also turned on during the nighttime measurements.

5. Location Strobridge: This location was monitored continuously from 4:00 p.m. on September 23, through 11:00 a.m. on September 25, 2008.

6. Location Bell Future: This location was monitored continuously from 5:00 p.m. on September 23, through 12:00 p.m. on September 25, 2008.

7. Location Reyes: Located at 9330 SR-58, a modular home approximately 4,232 feet northeast of the center of the project's power block, representing one of the nearest existing residential receptors to the project's power block. Staff learned about this location just before conducting this survey (email to staff from Mr. Strobridge on September 17, 2008, at 7:56 P.M.). This location was monitored continuously from 4:00 p.m. on September 23, through 11:00 a.m. on September 25, 2008.

8. Location ML7: This location was monitored continuously from 9:00 a.m. on September 24, through 10:00 a.m. on September 25, 2008.

Noise Table 6 summarizes these measurements (CEC 2008ae).

Noise Table 6
Summary of Staff-Measured Ambient Noise Levels

Measurement Sites	**One-Hour Measurements, dBA**	
	During Nighttime L_{eq}	**Average During Daytime L_{eq}**
ML1	43	48
ML3	32	35
SR10	50	50
Measurement Sites	**Long-Term Measurements, dBA**	
	Average During Nighttime L_{eq}	**Average During Daytime L_{eq}**
LT1	N/A	47
Strobridge	24	33
Bell Future	25	30
Reyes	33	37
ML7	40	43

Source: CEC 2008ae and staff calculations of average noise levels during measurement period (see Noise Appendix A)

Staff measured the existing ambient noise levels at the most noise-sensitive residential receptors, Reyes and Strobridge, continuously during a period of 44 hours. The applicant conducted only one-hour measurements at Strobridge with no measurements conducted at Reyes. Staff's survey, therefore, more realistically represents the noise environment at the project's most noise-sensitive residential receptors. Therefore, for the locations monitored by staff, staff uses the results of the staff's survey (the data in **Noise Table 6**) to evaluate the project's noise impacts at these locations. Staff's evaluation of the project noise environment shows that the noise environments at Bell Future and Bell Existing are very similar. Therefore, staff only surveyed one of these locations, Bell Future. For Bell Existing, staff uses the data from Bell Future to evaluate the project's noise impacts at this location.

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and normal long-term operation of the project.

Construction Impacts and Mitigation

Construction noise is usually a temporary phenomenon. With the exception of a relatively lengthy construction schedule (35 months), construction of the CESF project is expected to be typical of similar projects in terms of equipment used and other types of activities (CESF 2007a, AFC §5.12.2.1, Appendix P2).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under **CEQA Impacts**).

The applicant will perform noisy construction work during the hours of 7:00 a.m. to 7:00 p.m. Mondays through Fridays and 8:00 a.m. to 5:00 p.m. Saturdays and Sundays. This schedule will be in compliance with the San Luis Obispo County Land Use Ordinance. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

With implementation of the proposed Condition of Certification **NOISE-6**, the noise impacts of the CESF project construction activities would comply with the noise LORS.

CEQA Impacts

The CESF project construction would occur over a period of 35 months. Typical power plant construction is significantly shorter than this, generally 12 to 16 months. In addition, staff's analysis (below) shows that these activities, if unmitigated, would more than double the existing ambient noise levels at some of the project's most noise-

sensitive receptors. For typical power plants, staff normally considers construction activities that result in ambient noise levels that are more than doubled to be less than significant due to their relatively short construction period. (An increase of 10 dBA is equivalent to doubling the noise level.) However, due to the long construction period for the CESF and because the CESF project would be located in a very quiet environment, construction noise resulting in more than doubling the ambient levels at the residences near the proposed CESF project site would have the potential to significantly disturb the residents living near the project site. Therefore, staff considers an increase of more than 10 dBA in the ambient noise levels at the project's noise sensitive receptors for as long as 35 months to create significant impacts. Staff believes this is an appropriate standard for a 3-year construction period. The 5-10 dBA standard that staff applies to operational noise is not appropriate, given the shorter period of time (3 years versus 30 years) and the fact that construction will be limited to during the day time hours. For further analysis and conclusions, please see below.

The applicant predicted construction noise levels in the AFC; they are summarized here in **Noise Table 7**. These noise levels would constitute a significant adverse impact.

Noise Table 7: Predicted Construction Noise Levels in AFC

Receptor	Range of Construction Noise Levels Over 35 Months, L_{eq} (dBA)	Measured Existing Ambient, Average Daytime L_{eq}[3] (dBA)
ML1	58-62[1]	48
ML3	62-66[1]	35
ML7	50-54[2]	43
SR10	59-63[1]	50
LT1	57-61[1]	47

[1] CESF 2007a, AFC Table 5.12-5, Appendix P2
[2] CESF 2007a, AFC Table 5.12-5. Construction noise level at ML7 is not provided to staff. Therefore, staff uses the data available for the nearby receptor labeled SR7.
[3] Noise Table 6, above

On July 3, 2008, the applicant submitted an AFC Supplement to the Energy Commission, proposing some changes to the project. The changes that would affect the project's noise impacts at the project's noise-sensitive receptors include the power block reconfiguration, addition of an emergency generator, addition of limited onsite manufacturing, and demolition of existing structures (CESF 2008h, §§1.2, 1.3, 1.4, 1.5, 2.12).

The applicant predicted construction noise levels that account for the noise impacts of these proposed changes; they are summarized here in **Noise Table 8**. As with the predicted noise levels contained in the AFC, these noise levels would constitute a significant adverse impact at several sensitive receptors.

Noise Table 8: Revised Predicted Construction Noise Levels in AFC Supplement

Receptor	Approximate Distance from Center of Power Block (feet)	Range of Construction Noise Levels Over 35 Months, L_{eq}[1] (dBA)	Measured Existing Ambient, Average Daytime L_{eq}[5] (dBA)	Cumulative (dBA)	Change (dBA)
ML1	7,216	53-58	48	54-58	6-10
ML3	6,317	53-59	35	53-59	18-24
ML7	Not Recorded	43-48[2]	43	46-49	3-6
SR10	5,740	55-60	50	56-60	6-10
LT1	9,348	52-56	47	53-57	6-10
Strobridge	3,230	59-65[3]	33	59-65	26-32
Bell Future	10,207	49-55[3]	30	49-55	19-25
Bell Existing	12,356	48-53[3]	30	48-53	18-23
Reyes	4,232	56-62 [4]	37	56-62	19-25

[1] CESF 2008h, Table 2.12-1
[2] CESF 2008h, Table 2.12-1. Construction noise level at ML7 is not provided to staff. Therefore, staff uses the data available for the nearby receptor labeled SR7.
[3] CESF 2008f, Data Response 84; CESF 2008h, Table 2.12-1
[4] CESF 2008q
[5] Noise Table 7, above

In the PSA, staff concluded that because project construction would result in increases of more than 10 dBA at several of the noise sensitive receptors for the entire construction period (see **Noise Table 8**, last column) project construction would result in significant adverse noise impacts. Therefore, staff asked the applicant to prepare a noise mitigation plan that demonstrates that those impacts can be reduced to less than significant.

On February 13, 2009, the applicant submitted the DNMP (CESF 2009a). Staff has reviewed this plan and concludes that the proposed mitigation measures discussed in this plan are feasible measures that can effectively and significantly reduce construction noise. For further analysis and conclusions, please see below.

Staff uses the results of the staff's ambient noise survey, summarized in **Noise Table 8,** to evaluate the project's construction noise impacts. Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric.

In the DNMP, in contrast to the earlier prediction efforts described above, the applicant has remodeled the project's predicted construction noise using a more refined modeling technique, Cadna/A. Cadna/A allows for input of all pertinent features (such as terrain or structures) that affect noise, resulting in accurate estimates of existing and future noise levels. According to the DNMP, this new modeling accounts for elevation and terrain features, and the existing structures. According to the applicant, noise emission levels were input using octave band levels to accurately estimate noise propagation and attenuation effects. To ensure the validity of the results, the model was tested using previously measured and modeled noise data, and found to be consistent with both practice and theory (CESF 2009a, §3.1.1). Attenuation due to spherical wave divergence, topographic features, and standard atmospheric absorption (70 percent relative humidity and 50°F) were included in the calculation of predicted noise levels.

According to the applicant, this departure from the spreadsheet-based method used to predict aggregate construction noise used in the PSA is considered to be more accurate for the following reasons:

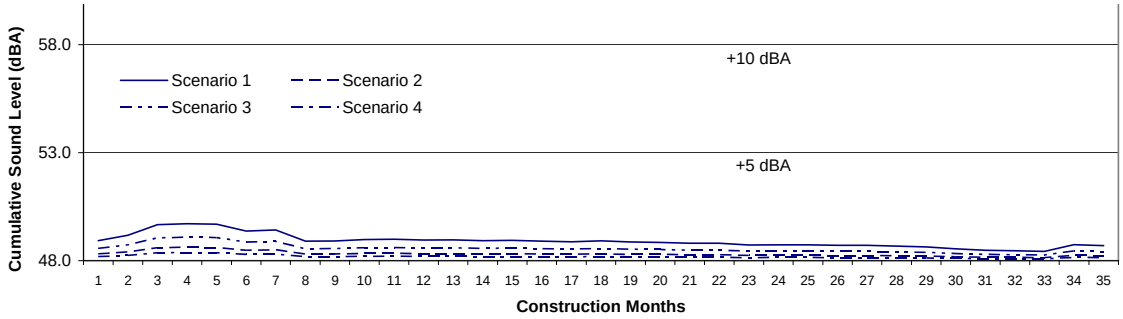
- Sound sources are input as sound power levels at octave band resolution, not merely single-value overall A-weighted levels. This source definition refinement allows better targeting of noise mitigation need (and consequently, noise control or sound abatement means) at the octave bands that most influence the A-weighted overall levels.
- In accordance to the industry-accepted ISO 9613-2 standard, Cadna/A includes air absorption and ground effects in its algorithms. These are two potential sources of natural attenuation that were not included, for the purpose of conservatism, in the spreadsheet-based model but can be accurately assessed with ease by Cadna/A.
- Whereas the spreadsheet model considered the uncertain positions of multiple sound sources lumped together at one or more acoustic centers (e.g., power block, onsite manufacturing facility), Cadna/A can more realistically allow individual sources to occupy or move about pre-defined areas referred to as "construction zones" in the DNMP (CESF 2009a, Figure 4).

Staff believes these factors reasonably explain the differences between the predictions used in the PSA and the modeled predictions in the DNMP.

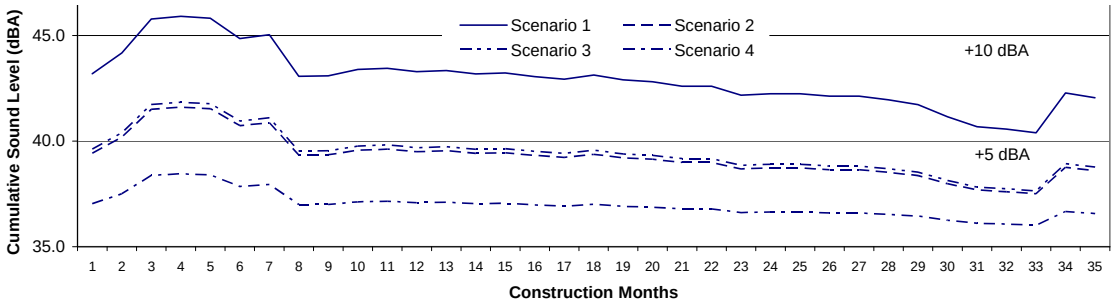
Note that the applicant has eliminated pile driving (a major source of construction noise) (CESF 2009a, §3.1.2.2.4). This will reduce construction noise impacts at the affected receptors during construction months 3, 4 and 5.

The resultant predicted construction noise levels in the DNMP are summarized here in **Noise Figure 5** through **Noise Figure 13** (CESF 2009a, Figure 6 through Figure 14). The bottom line in each figure represents the existing ambient noise level. The curve labeled Scenario 1 in these figures shows the unmitigated construction noise levels at each receptor. The curve labeled Scenario 2 represents the noise levels that will result from mitigating the construction noise by upgrading the engine noise suppression features for construction equipment, and the curve labeled Scenario 3 shows the noise levels that will result from mitigating the noise through the erection of temporary construction noise barriers near the noise source(s) (i.e., near construction equipment). Finally, the curve labeled Scenario 4 represents the noise levels that will result from mitigating the noise through the implementation of both Scenarios 2 and 3 simultaneously.

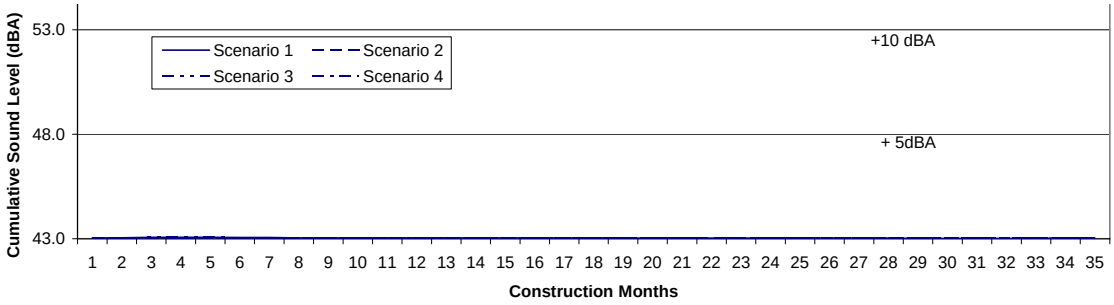
Noise Figure 5: Revised Predicted Cumulative Construction Noise Levels in DNMP at ML1



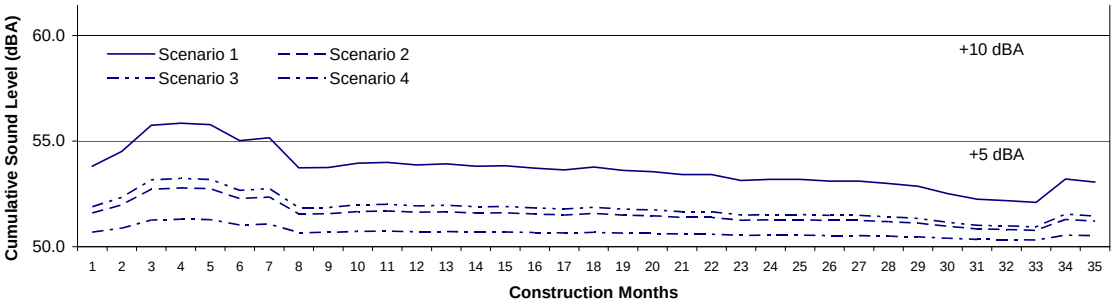
Noise Figure 6: Revised Predicted Cumulative Construction Noise Levels in DNMP at ML3



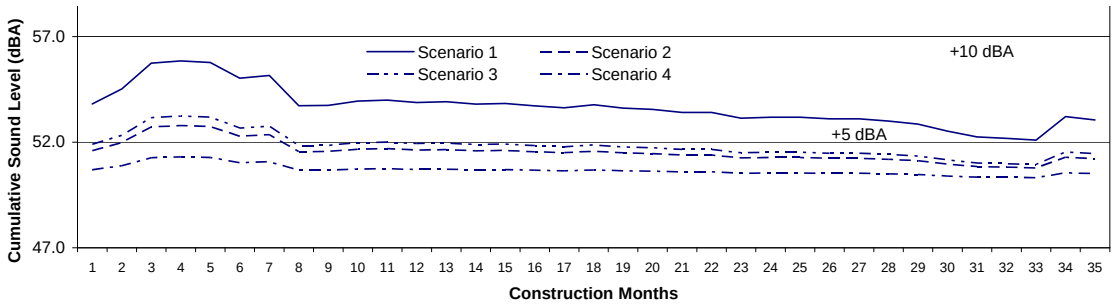
Noise Figure 7: Revised Predicted Cumulative Construction Noise Levels in DNMP at ML7



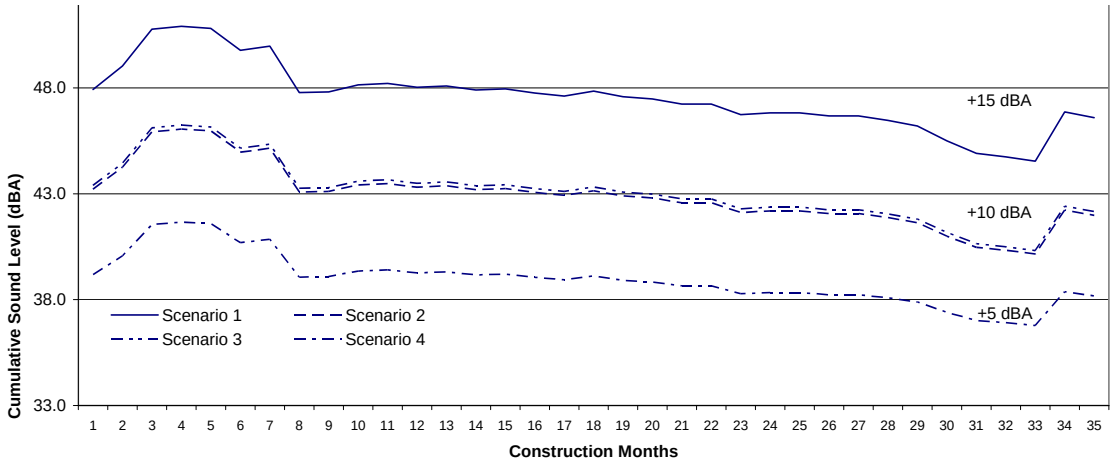
Noise Figure 8: Revised Predicted Cumulative Construction Noise Levels in DNMP at SR10



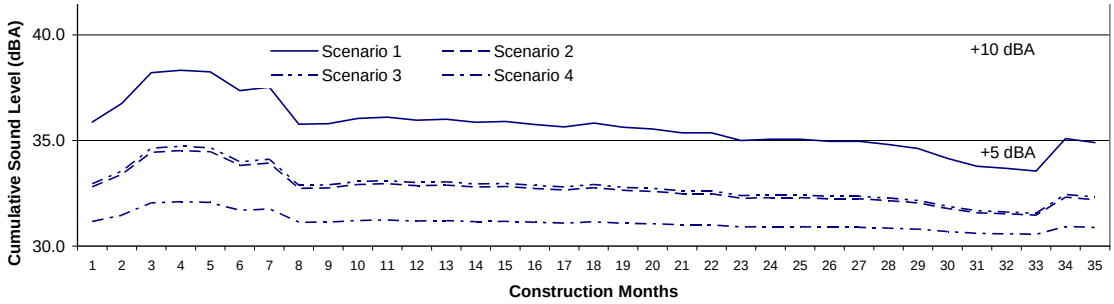
Noise Figure 9: Revised Predicted Cumulative Construction Noise Levels in DNMP at LT1



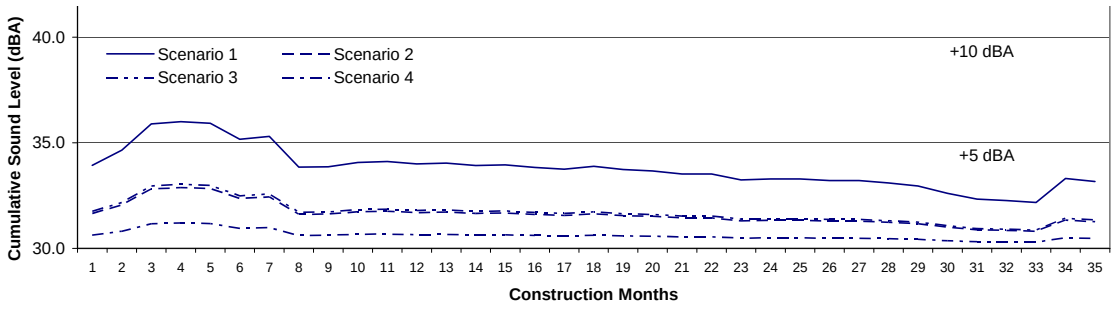
Noise Figure 10: Revised Predicted Cumulative Construction Noise Levels in DNMP at Strobridge



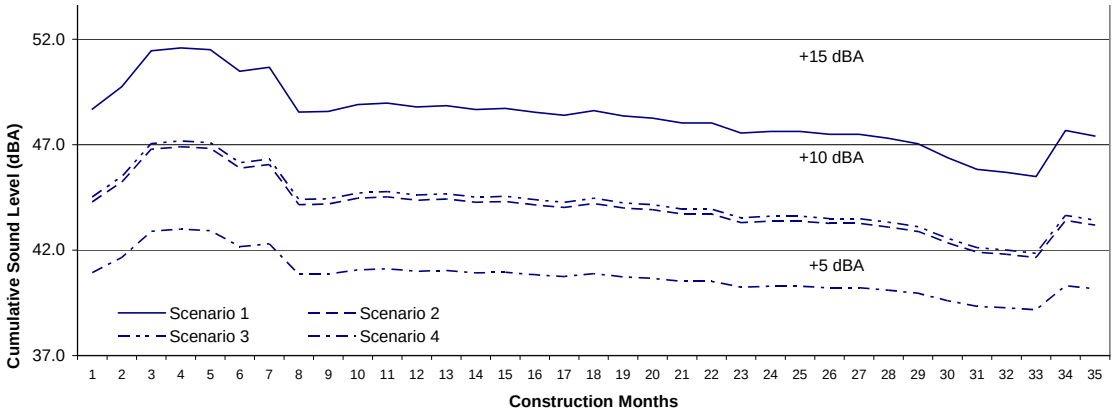
Noise Figure 11: Revised Predicted Cumulative Construction Noise Levels in DNMP at Bell Future



Noise Figure 12: Revised Predicted Cumulative Construction Noise Levels in DNMP at Bell Existing



Noise Figure 13: Revised Predicted Cumulative Construction Noise Levels in DNMP at Reyes



Noise Figure 10 shows that the unmitigated construction noise, referred to as Scenario 1, would result in more than 10 dBA increase in the existing ambient noise levels at Strobridge during the 35-month construction period (CESF 2009a, Figure 11). It also shows that construction noise mitigated through equipment engine suppression upgrades, Scenario 2, or erection of temporary noise barriers, Scenario 3, would result in more than 10 dBA increase in the ambient noise at this location during the first several months of the 35-month construction period. Staff considers this increase during several months to be less than significant due to its temporary nature. The applicant plans to initially implement either Scenario 2 or Scenario 3. If noise complaints result in requiring further mitigation, the applicant is willing and ready to implement the other scenario not initially elected. This would result in Scenario 4 (both Scenario 2 and Scenario 3 implemented). This approach seems reasonable to staff. This approach is consistent with typical industry practice for large scale construction projects.

Noise Figure 13 shows the unmitigated construction noise to result in more than 10 dBA increase in the existing ambient noise levels at Reyes during most of the 35-month construction period (CESF 2009a, Figure 14). It also shows the mitigated construction noise (Scenario 2 or Scenario 3) would result in less than 10 dBA increase in the ambient noise at this location during the entire construction period. The applicant plans to initially implement either Scenario 2 or Scenario 3. If noise complaints result in requiring further mitigation, the applicant is willing and ready to implement the other scenario not initially elected, resulting in Scenario 4.

Noise Figure 6 shows the unmitigated construction noise to result in less than 10 dBA increase in the existing ambient noise level at ML3 during the 35-month construction period, except months 3-5. **Noise Figure 6** also shows the mitigated construction noise (Scenario 2 or Scenario 3) would result in less than 10 dBA increase in the ambient noise at this location during the entire construction period. The applicant will initially implement either Scenario 2 or Scenario 3. If noise complaints or noise measurements result in requiring further mitigation, the applicant is willing and ready to implement the other scenario not initially elected, resulting in Scenario 4.

Noise Figure 5, **Noise Figure 8**, **Noise Figure 9**, **Noise Figure 11**, and **Noise Figure 12** show the unmitigated construction noise to result in less than 10 dBA increase in the existing ambient noise levels at five other identified noise-sensitive receptors (ML1,

SR10, LT1, Bell Future, and Bell Existing, respectively) during the 35-month construction period (CESF 2009a, Figures 6, 9, 10, 12, and 13). **Noise Figure 7** shows the unmitigated construction noise to be inaudible at ML7 (CESF 2009a, Figure 8). The applicant will initially implement either Scenario 2 or Scenario 3. If noise complaints result in requiring further mitigation, the applicant is willing and ready to implement the other scenario not initially elected, resulting in Scenario 4.

Staff agrees with this approach. With implementation of the DNMP, project construction can be mitigated to create less than significant impacts at the project's noise-sensitive receptors. To ensure compliance, staff proposes Condition of Certification **NOISE-7** requiring implementation of the DNMP.

Typically, during construction, construction workload, equipment roster, work schedule, and work locations are constantly changing. Each construction activity typically moves along at a rapid pace, lasting only a few days. Thus, the level and character of the noise produced during construction are almost always changing. It is, therefore, not practical to require the project owner to meet specific noise level limits for construction at the noise receptors listed above.

Nonetheless, based on the staff's evaluation of the DNMP, staff believes that construction impacts at the project's most noise-sensitive receptors can be mitigated to less than significant, resulting in no more than 10 dBA increase in the existing ambient levels, by employing practical and effective mitigation measures such as the three scenarios described above (CESF 2009a, p. ES-5, §§3.1.3.1, 4.1). The proposed mitigation measures discussed in this plan are consistent with the industry practice. Employment of equipment engine noise suppression upgrades and installation of construction noise barriers as required by Condition of Certification **NOISE-7**, and the implementation of Conditions of Certification **NOISE-1**, **NOISE-2** (noise complaint resolution process), **NOISE-6** (restriction on hours of construction and disallowing unnecessary noise), and **NOISE-8** (steam blow noise limits) will ensure that construction activities will create less than significant impacts at the noise-sensitive receptors. Condition of Certification **NOISE-6** would also require that haul trucks and other engine-powered equipment be equipped with adequate mufflers. Examples of these mufflers include intake silencers, sound absorptive linings, vibration dampeners, or additional partial or full enclosures for the engine housing/casing.

Conditions of Certification **NOISE-1** and **NOISE-2** would establish a noise complaint process to resolve any complaints regarding construction noise. If it is determined that the complaint is project related and the noise is considered disturbing, as confirmed by the CPM, the project owner must resolve the issue according to the procedures described in Condition of Certification **NOISE-2**.

Limited Nighttime Construction

In addition to construction during the daytime hours, the applicant proposes to perform limited nighttime construction activities (CESF 2007a, AFC §3.4.13.1). The AFC, however, does not address the noise impacts of these proposed nighttime activities at

the project's noise-sensitive receptors. Therefore, staff asked the applicant to evaluate these impacts (CEC 2008ac).

In its response, the applicant stated that the noisy construction activities would be scheduled to occur during the daytime hours, with less noisy activities occurring at night. According to the applicant, the nighttime activities would include, but would not be limited to, refueling equipment, staging material for the following day's construction activities, quality assurance and quality control, concrete pouring for structural foundations, and power plant commissioning (CESF 2008f; CESF 2009a, §3.1.2.2.5). The applicant further stated that these activities would occur from time to time, not on a regular, long-term, basis.

The applicant believes it would be necessary to pour some concrete foundations during the early morning and evening hours on hot summer days. The applicant envisions that this work would commence at 5 a.m. and could continue until 9 p.m. The primary foundations requiring concrete pouring during these extended hours are part of the power block. To ensure concrete pouring would occur during the above hours, staff has included a limitation in Condition of Certification **NOISE-6**.

The applicant concluded that concrete pouring would be at least 10 dBA quieter than the typical daytime construction activities, because only about 10 percent of the daytime equipment would be operating at night. The analysis in the DNMP demonstrates that the loudest of these activities would increase the ambient noise at the project receptors by no more than 10 dBA (CESF 2009a, Table 6).

In addition, the nighttime activities would be short-term and temporary, occurring during the hot summer days as opposed to year-round. Concrete pouring and other noisy activities would not occur during late night and the earliest morning hours when people are trying to sleep. Therefore, staff considers the noise impacts of the proposed nighttime construction work to be less than significant. However, to ensure these activities would not create significant adverse noise impacts, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints regarding construction-related noise. If it is determined that the complaint is project related and the noise is considered disturbing, as confirmed by the CPM, the project owner must resolve the issue according to the procedures described in Condition of Certification **NOISE-2**.

With implementation of the proposed conditions of certification, the noise impacts of the nighttime project construction would be less than significant.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing that comprise the

steam path have accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the boiler or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a *high pressure steam blow*, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, are performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

High pressure steam blows, if unsilenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet. Unsilenced steam blows could be disturbing at the nearest noise-sensitive receptors, depending on the frequency, duration, and noise intensity of venting. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 89 dBA at 50 feet.

A quieter steam blow process, referred to as *low pressure steam blow* and marketed under names such as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of about 36 hours. Resulting noise levels reach about 86 dBA at 50 feet.

The applicant has predicted steam blow noise levels at the project's noise-sensitive receptors (CESF 2009a, Table 5). They are shown here in **Noise Table 9**.

Noise Table 9:
Predicted Noise Levels for Steam Blows

Receptor	Ambient Leq (dBA)	Distance to the Nearest Steam Blow Location (feet)	High Pressure Steam Blow (129 dBA at 50')	High Pressure with Silencer (89 dBA at 50')	Low Pressure Steam Blow (86 dBA at 50')	Cumulative, Ambient Plus Low Pressure
ML1	48	4,461	86	46	43	49
ML3	35	5,248	83	43	40	41
ML7	43	15,744	63	23	20	43
SR10	50	2,460	93	53	50	53
LT01	47	5,740	82	42	39	48
Strobridge	33	4,592	85	45	42	43
Bell Future	30	8,528	76	36	33	35
Bell Existing	30	10,496	72	32	29	33
Reyes	37	3,608	88	48	45	46

As seen in **Noise Table 9**, the continuous low pressure method would result in an increase of no more than 10 dBA in the ambient level at each sensitive receptor, while the silenced high pressure method would result in more than 10 dBA increases in the ambient levels at two of the receptors. Therefore, staff proposes Condition of Certification **NOISE-8**, which would require the employment of low pressure steam blow. This condition would also require the noise, from steam blows only, not to exceed the levels in **Noise Table 9**, sixth column.

Linear Facilities

The only new offsite linear facility would be an electric transmission line approximately 90 feet long, interconnecting to the existing PG&E Morro Bay–Midway transmission line (CESF 2007a, AFC §§ 1.2.3, 3.1, 3.4.4.1, 3.4.12, 3.4.12.1, 3.6.1, Table 3.4-13).

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, noisy construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6**.

Pile Driving

In the AFC, the applicant stated that construction of the CESF would require pile driving (CESF 2007a, AFC §5.12.2.1). Pile-driving was expected to occur during construction months 3, 4, and 5.

In the DNMP, the applicant states that it has revised the allocation of the project's construction equipment on a monthly basis, which has included elimination of pile

driving (CESF 2009a, §3.1.2.2.4). In the PSA, staff proposed a condition of certification to require pile driving to be performed using a quieter process than the traditional pile driving techniques (**NOISE-7** in the PSA). Because pile driving will not occur, staff has deleted this condition. To ensure pile driving will not occur, however, staff has added a requirement to Conditions of Certification **NOISE-6** disallowing this activity.

Vibration

The only construction activity likely to produce vibration that could be perceived off site would be pile driving. The applicant has revised the allocation of the project's construction equipment on a monthly basis, which has included elimination of pile driving (CESF 2009a, §3.1.2.2.4). Vibration attenuates rapidly; it is likely that no vibration would be perceptible at any appreciable distance from the project site.

Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (CESF 2007a, AFC §5.12.2). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise sources of the CESF project include air-cooled condensers, steam turbine generators, air compressors, electric transformers, and various pumps and fans, with the air-cooled condensers being the dominant sources of noise (CESF 2007a, AFC Table 5.12-6, Appendix P3). Staff compares the projected project noise with the applicable LORS, in this case the Noise Element of the San Luis Obispo County General Plan and the Noise Ordinance of the San Luis Obispo County Land Use Ordinance. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

The applicant proposes the following noise mitigation measures (CESF 2007a, AFC §§3.4.3.3, 5.12):

- acoustical enclosures that house the steam turbine generators
- low-noise air-cooled condenser fans; and
- various pump insulations.

In addition, the applicant plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (CESF 2007a, AFC §5.12.4).

Compliance with LORS

In the AFC, the applicant performed noise modeling to determine the project's noise impacts at sensitive receptors (CESF 2007a, AFC §5.12.2.2.2, Table 5.12-7). Later, the

applicant revised this modeling to reflect the project changes proposed in the AFC Supplement. The changes that affected the noise modeling include reconfiguration of the air-cooled condenser units, resulting in a 20 percent reduction in the number of condenser fans and the addition of the emergency generator. The resultant noise predictions are lower than the predictions given in the AFC. In the PSA, staff used these values to evaluate the project's noise impacts at the noise-sensitive receptors.

In the PSA, staff concluded that the project's operational noise would cause significant adverse noise impacts in the affected area. Staff asked the applicant to prepare a draft mitigation plan that demonstrates that these impacts can be reduced to less than significant. On February 13, 2009, the applicant submitted the DNMP (CESF 2009a).

Staff has reviewed the DNMP and recognizes that the applicant has performed a detailed project-specific noise analysis to predict the project's impacts at the noise-sensitive receptors.

The revised noise predictions are summarized here in **Noise Table 10** (CESF 2009a, Table ES-1; CESF 2008q). In this FSA, staff uses the same existing ambient noise levels used in the PSA to evaluate the project's noise impacts. These levels are the results of the data gathered by staff in its September 2008 noise survey.

Noise Table 10: Revised Predicted Operational Noise Levels, dBA

Receptor	Project	Measured Existing Ambient, Average Daytime L_{eq}[1]	Cumulative	Change
ML1	36	48	48	0
ML3	34	35	38	+3
ML7	22	43	43	0
SR10	40	50	50	0
LT1	33	47	47	0
Strobridge	38	33	39	+6
Bell Future	30	30	33	+3
Bell Existing	28	30	32	+2
Reyes	38	37	41	+4

[1] NOISE Table 6, above

As explained above, the Noise Element of the San Luis Obispo County General Plan and the Noise Ordinance of the San Luis Obispo County Land Use Ordinance limit noise levels from stationary noise sources to 50 dBA L_{eq} (hourly average) during the daytime hours of 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} during the nighttime hours of 10:00 p.m. to 7:00 a.m. at the property line of a noise-sensitive receptor (SLOC 2008e and SLOC 2004).

In many cases, a power plant is intended to operate around the clock for much of the year. The CESF would operate only during the daytime hours, typically 15 hours per day during the summer (with fewer hours during the fall, winter, and spring), when sufficient solar insolation is available (CESF 2007a, AFC §5.12.2.2.1). Because the CESF would operate during the daylight hours, staff evaluated the project's noise impacts with respect to the LORS daytime limit of 50 dBA (L_{eq}). (Please see below for limited nighttime activities.)

As seen in **Noise Table 10**, second column, the project's operational noise levels at the project's noise-sensitive receptors would range from 22 dBA to 40 dBA, below the LORS limit of 50 dBA. Therefore, noise due to the operation of the CESF project would be in compliance with the applicable LORS.

To ensure these predicted noise levels would not be exceeded, staff proposes Condition of Certification **NOISE-4**. Also, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints regarding operation-related noise.

CEQA Impacts

As explained, the CESF project would operate during the daylight hours. Thus, staff compares the project's noise levels to the existing daytime ambient noise levels at the project's noise-sensitive receptors. (Please see below for limited nighttime activities.)

Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is therefore best represented by the average noise level, referred to as L_{eq}. Staff's evaluation of the above noise surveys shows that the daytime noise environment in the CESF project area consists of both intermittent and constant noises. Thus, staff compares the project's noise levels to the daytime ambient L_{eq} levels at the project's noise-sensitive receptors.

As seen in **Noise Table 10**, last column, with the exception of Strobridge, project operation would result in a 0-4 dBA increase in the existing ambient noise levels at the project's noise-sensitive receptors. Staff considers an increase of up to 5 dBA as a less-than-significant impact. Staff proposes Condition of Certification **NOISE-4** to ensure that the noise levels due to project operation would not create significant noise impacts at these locations. Condition of Certification **NOISE-4** requires the project owner to limit the noise to the values specified in **Noise Table 10**. If the noise exceeds those limits, the project owner must implement additional mitigation measures to reduce the noise to a level of compliance. (Please see Condition of Certification **NOISE-4** for details.)

In the PSA, the project's operational noise level was expected to be 41 dBA at Strobridge. This, when combined with the ambient noise level of 33 dBA L_{eq} at this receptor, would have resulted in 42 dBA L_{eq}, 9 dBA above the ambient. Staff considers an increase of between 5 and 10 dBA to be considered adverse, but such an increase could be either significant or insignificant, depending upon the specific circumstances of a particular case. A noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. The project's noise environment is very quiet. Thus, staff considers an increase of between 5 and 10 dBA in the ambient level, resulting from project operation, to be significant if the resultant project plus ambient noise level is above 40 dBA.

The PSA concluded that because project operation would elevate the ambient level at Strobridge by 9 dBA and because the project would result in 42 dBA, above the recommended limit of 40 dBA, staff considers this impact to be significant.

Noise Table 10 shows that the revised project's operational noise level of 38 dBA at Strobridge, when combined with the ambient noise level of 33 dBA L_{eq} at this location, would result in 39 dBA L_{eq}, 6 dBA above the ambient, and 3 dBA lower than previously expected in the PSA. Staff considers the increase of 6 dBA to be less than significant because operation would not occur at night and early morning when quiet is important and people are typically more sensitive to noise and because the resulting noise level is not above 40 dBA. Staff limits project noise to cause no more than a 5 dBA increase in the ambient levels at all receptors for the nighttime maintenance activities. (Please see below for limited nighttime activities.)

As explained above, the applicant's latest noise modeling shows the project's operational noise impacts to be less than significant at the project's noise-sensitive receptors (CESF 2009a, Table ES-1). However, staff does not rely on the applicant's modeling to conclude that the project is compliant. Furthermore, staff has used the same performance standard regardless of the applicant's noise level predictions from either modeling. Staff proposes the following conditions of certification to ensure that regardless of the level of accuracy of the noise modeling, the project would create less than significant impacts, even in the event that the project initially fails to meet the proposed noise level limits.

After the project has become operational, in compliance with Condition of Certification **NOISE-4**, noise surveys will be conducted during two different times of the year to measure the project's contribution to the ambient noise. If either of these surveys, or another survey initiated by a noise complaint (as required by Condition of Certification **NOISE-2**) shows the project to be out of compliance with the limits in Condition of Certification **NOISE-4**, the project owner will have to implement additional mitigation measures**.** Based on staff's experience with past power plant projects, staff believes feasible mitigation measures are available to achieve compliance. Examples of these measures include installing additional sound insulation on noisy equipment, erecting additional sound walls around such equipment (i.e., transformers, various pumps and fans, air-cooled condenser units, and air compressors), and operating the plant at a lower power output.

Staff is aware that a variety of effective industrial noise mitigation measures are available, beyond what are commonly included in the design of air-cooled condensers as standard acoustic features, to further reduce condenser fan noise. Examples of such mitigation measures are installation of sound absorptive material and barriers on the air-cooled condenser units. Such measures can reduce the noise at project receptors by several decibels.

Another effective measure can be operating the plant at a lower-than-full power output during any time of the year (during cold and cloudy days, and when solar insulation is plentiful [sunny spring, summer, and fall days]). The amount of reduction in output can be adjusted to achieve the desired noise reduction.

Staff recalls one situation where the project owner had to install additional sound walls and acoustic insulation in order to bring the project into compliance. That was SMUD Cosumnes Power Plant (CPP) (01-AFC-19). After the start of operation, the noise survey showed noncompliance by several decibels. As required by the Energy Commission Decision for that project, the project owner then added these measures which resulted in a noise reduction of 8.4 dBA at the affected receptor. This brought the project into compliance.

Therefore, staff is confident that in the event that additional mitigation measures will be necessary, practical and effective measures are available to meet the CESF's needs.

Staff notes that in the past approximately 20 years, staff has only encountered this one situation (CPP) where the applicant's pre-project modeling predicted lower project noise levels than the operational survey demonstrated. During this period, all of the other power plants that were licensed by the Energy Commission, were built, and became operational (31 projects) proved to be within the limits predicted in their noise modeling without additional mitigation measures.

Even though the DNMP demonstrates that operational noise would likely pass compliance at the nearest receptor, Strobridge, staff encourages the applicant to consider relocating the power block to or near the center of the site. If the power block is built at the location currently proposed and the project proves to be out of compliance during operation at Strobridge, the opportunity to take advantage of the noise reduction effect of relocating the power block will have been lost. However, staff is confident that retrofitting the project features to bring the project into compliance is both effective and practical regardless of the power block location. The difference will be the higher cost of retrofitting the project with the power block at the currently proposed location, as opposed to the center of the site. Regardless of the power block location, Condition of Certification **NOISE-4** will require the project to meet the limits specified therein.

In light of the following Conditions of Certification, staff concludes that project operation would create less than significant adverse noise impacts.

Nighttime Maintenance Activities

The applicant proposes to perform limited nighttime project activities. These activities would include routine solar reflector cleaning; operation of the occupied building heating, ventilation, and air conditioning (HVAC) systems; and limited operation of the power block equipment.

Staff asked the applicant to evaluate the noise impacts of these activities at the project's noise-sensitive receptors (CEC 2008ad). The applicant did this and presented the results to staff (CESF 2008i, CESF 2008q).

According to the applicant, the major noise sources anticipated from the reflector cleaning activity would include the engine of the vehicle that would be used to transport the maintenance personnel to the reflectors, a portable lighting plant equipped with a generator that would be mounted to the vehicle's cargo bed, and HVAC systems assumed to be in operation during the nighttime at the occupied administration building

and control tower. Also for the purpose of this noise analysis, the applicant assumed ventilation fans for the shop/warehouse building, the maintenance building, and the steam turbine generator enclosures to be in operation. Another source of noise taken into account in this analysis was the feed-water pump operating to keep the water-steam mixture through the steam lines from freezing during the night (CESF 2007a, AFC §3.4.2; CESF 2008j).

Much like a typical power plant in normal operational mode, the HVAC system, the feed-water pump, and the ventilation fans would mostly generate steady and continuous noise. However, because of the irregular nature of the reflector cleaning activity, the noise from this activity would be mainly intermittent. Therefore, because the nighttime project activities would contribute to both steady and intermittent ambient noise environment, staff evaluates their impacts with regard to the hourly average ambient noise levels, or L_{eq}, at the project's noise-sensitive receptors. (The noise that stands out during this time is best represented by the L_{eq} scale.)

As described in **Noise Table 10** of the PSA, the earlier modeling showed a 10 dBA increase in the nighttime ambient noise level at Strobridge. The PSA considered this increase to result in a less-than-significant impact. This conclusion was based on the fact that people are typically indoors during the nighttime hours. From Mr. Strobridge's comments on the PSA and from other residents living near the project site who spoke to this effect at the PSA Workshop, staff learned that the people living in the project vicinity typically spend a lot of time outdoors during those hours, including sleeping outside during the warm seasons of the year. Because people will likely be trying to sleep during late night and early morning, as opposed to engaging in typical daytime activities, an increase of 10 dBA in the exterior nighttime ambient levels would cause significant disturbance. Staff, therefore, believes a threshold of 5 dBA is most appropriate.

The latest noise modeling (described in the DNMP) more accurately predicts the noise impacts of the nighttime maintenance activities at the project's noise-sensitive receptors (CESF 2009a §3.2.3). This modeling shows the noise reduction provided by replacing the diesel-powered reflector cleaning vehicle and conventional combustion-engine powered portable lighting plant with an electric-powered vehicle and battery-powered portable lighting plant, as recommended by staff in the PSA, can mitigate the impacts to less than significant levels. The results of the analysis described in the DNMP are summarized below, in **Noise Table 11** (CESF 2009a, Table ES-3). In order to reduce the impact to 5 dBA above the ambient at Strobridge, the project's noise level must be no more than 27 dBA at this residence.

Noise Table 11:
Predicted Noise Levels for Nighttime Maintenance Activities, with Electric Vehicle and Battery-powered Portable Lighting Plant

Receptor	Project L_{eq} [1] (dBA)	Measured Existing Nighttime Ambient L_{eq} [2] (dBA)	Cumulative, Exterior L_{eq} (dBA)	Change in Exterior Level (dBA)
ML1	23	43	43	0
ML3	23	32	33	+1
ML7	11	40	40	0
SR10	30	50	50	0
Strobridge	26	24	28	+4
Bell Future	19	25	26	+1
Bell Existing	16	25	26	+1
Reyes	27	33	34	+1

[1] CESF 2009a, Table ES-3
[2] Noise Table 6 above

As seen in **Noise Table 11**, the resultant increase in the nighttime exterior noise level at Strobridge would be 4 dBA. Also as seen in **Noise Table 11**, the resultant increases in the nighttime exterior noise levels at all of the other most noise-sensitive receptors would be 0-1 dBA. Staff considers an increase of up to 5 dBA to be less than significant. To ensure compliance, staff proposes Conditions of Certification **NOISE-4** and **NOISE-9**.

After the project has become operational, two noise surveys as required by Condition of Certification **NOISE-4** will be conducted to measure the project's noise impacts due to the nighttime maintenance activities. If either of these surveys, or another survey initiated by a noise complaint shows the project to be out of compliance with the limits in **NOISE-4** (levels shown in **Noise Table 11**, second column) the project owner will have to implement additional mitigation measures.

Based on staff's experience with past power plant projects, staff believes feasible mitigation measures are available to achieve compliance. Examples of these measures include installing additional sound insulation on noisy equipment and erecting additional sound walls around such equipment (i.e., HVAC systems, and various pumps and fans) that would be operating at night. These measures would help to reduce the overall noise from the facility.

The staff's proposed conditions of certification also include a noise complaint resolution process (**NOISE-2**) and requiring the use of an electric-powered cleaning vehicle and battery-powered lighting plant (**NOISE-9**).

Staff has successfully used the methods described in these conditions of certification in numerous past power plant projects and is confident they will be adequate to resolve any potential noncompliance-related issues for the CESF.

As seen in **Noise Table 11**, the noise levels from these nighttime activities would be below the LORS nighttime limit of 45 dBA L_{eq} at all of the identified noise receptors. Thus, these activities would be in compliance with the applicable noise LORS.

In light of the mitigation options listed in the DNMP and the proposed conditions of certification, staff believes the noise impacts of the project's maintenance activities will be mitigated to less than significant.

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (CESF 2007a, AFC §5.12.4.1). To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

The only new offsite linear facility would be an electric transmission line approximately 90 feet long interconnecting to the existing PG&E Morro Bay–Midway transmission line (CESF 2007a, AFC §§ 1.2.3, 3.1, 3.4.4.1, 3.4.12, 3.4.12.1, 3.6.1, Table 3.4-13). Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors. For further discussion, see the **TRANSMISSION LINE SAFETY AND NUISANCE** section of this document.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (groundborne vibration) and air (airborne vibration).

The operating components of the CESF plant would consist of high-speed steam turbine generators and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors would be attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, staff agrees with the applicant that groundborne vibration from the CESF project would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. None of the project equipment is likely to produce low frequency noise; this makes it highly unlikely that the CESF would cause perceptible airborne vibration effects.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (CESF 2007a, AFC §§5.12.2.2.3, 5.12.5). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**.

Temperature Inversion

In meteorology, an inversion is a deviation from the normal change of an atmospheric property with altitude (i.e., an increase in air temperature with height). It almost always refers to a temperature inversion, that is, an increase in temperature with height, or to the layer within which such an increase occurs. An inversion can lead to pollution such as noise being bounced back to near the ground. Inversion is typically strongest during cold, calm, winter mornings when ground-level air is colder than high-level air and when the winds are calm. When an inversion layer is present, for example early in the morning when ground-level air temperatures are cool and high-level air temperatures are warm, if a sound occurs at ground level, the sound wave can bounce off the warmer upper layer and return back to ground level; the sound is therefore heard at a distance much further than normal. In other words, it sounds as if the noise source is closer than it really is.

The project site is located in a quiet rural setting within a basin called the Carrizo Plain. Even though temperature inversion occurs in such a setting, it would be premature, prior to commencement of project operation, to assume this phenomenon will likely noticeably intensify the noise impacts of the CESF and to require the applicant to consider additional mitigation measures at this time, solely based on this assumption.

As explained by the members of the public in the PSA workshop, elevated noise levels can be heard also during the times when the weather conditions in the project area are different from those typically resulting in inversion.

To ensure the effects of temperature inversion, or other weather-related conditions that could result in elevated noise levels, will be captured in monitoring, staff, in Condition of Certification **NOISE-4** recommends the ambient noise survey to be performed during two different times of the year, once during a cold and cloudy day, to capture the effects of inversion, and once during a late spring, summer, or early fall day, to capture the potential effects of other weather-related conditions. If either survey shows noncompliance, Condition of Certification **NOISE-4** would require the applicant to employ additional mitigation measures. Staff does not list specific mitigation measures in the conditions of certification for project operation, but the conditions of certification require that additional measures be implemented, as acceptable to the CPM.

Additionally, Condition of Certification **NOISE-2** will allow for a complaint resolution process for up to one year after the project has become operational. If any noise complaint justifies the need for another noise survey, this would provide yet another opportunity to try and capture those weather-related effects.

As explained under **Operation Impacts and Mitigation**, **CEQA Impacts**, staff recalls one situation where the project owner had to install additional sound walls and acoustic insulation in order to bring the project into compliance, the CCP project in Sacramento County, California. The noise environment in the CPP project area is similar to the CESF project area, quiet rural. After the start of operation of the CPP project, the noise survey showed noncompliance by several decibels. As required by the Energy Commission Decision for that project, the project owner then added additional mitigation measures which brought the project into compliance.

Based on staff's experience with past power plant projects, staff believes feasible mitigation measures are available to achieve compliance. It is typically more effective to add mitigation measures after the power plant has become operational, when one can better understand the characteristics and source(s) of the excessive noise. Examples of these measures are installing additional sound insulation on the noisiest equipment, erecting additional sound walls around such equipment, and operating the plant at a lower power output.

Operating the plant at a lower-than-full power output may result in meaningful noise reduction. On cold winter days (when strong inversion may be present), the project would likely operate at lower than full-power output due to lack of sufficient solar insolation. The air-cooled condensers would not need to operate at full load due to the low air temperatures (cold air provides a better cooling effect than warm air). Thus, fewer condenser cooling fans would likely operate at this time resulting in reduction in the project's overall noise level. This may be sufficient to reduce the project's impacts to less than significant. If not, additional measures must be implemented to achieve this.

Staff has successfully used the methods described in the conditions of certification in numerous past power plant projects and is confident they will be adequate to resolve any potential noncompliance-related issues for the CESF.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of impacts solely attributable to the project.

Topaz Solar Farm (TSF) project, a photovoltaic (PV) solar power plant, is planned for location on 4,100 acres of land adjacent to the proposed CESF site (CESF 2008j). The proposed TSF project site is to the west, north, and east of the proposed CESF project site (see **Noise Figure 4**). The PV technology is relatively quiet. As with any typical PV

power plant, the only major sources of noise for the TSF project during plant operation would include the transformers and inverters, as there would be no thermal or thermal-related components (steam turbines, cooling systems, or related pumps and fans). According to the Conditional Use Permit Application (CUP) for the TSF project, the transformers and inverters would be located in the center of each photovoltaic block (five-acre blocks) or within the TSF project substation (Topaz 2008).

The CUP describes the TSF's operational noise to be similar to the Sarina project in Ontario, Canada, a proposed 60 megawatt solar power plant that would employ the same technology as the TSF project and would have a similar configuration as the TSF project. Two noise contour maps were prepared for the Sarina project. In the CUP, the TSF project applicant has used these maps to evaluate the noise impacts of TSF at the adjoining areas. According to the CUP, the noise from the transformers and inverters within the TSF project footprint will not likely be discernable at more than one-hundred feet from the project site boundaries (Topaz 2008). Furthermore, according to the Initial Study Summary prepared by San Luis Obispo County, the permitting agency for the TSF project, exposure of people to noise levels from TSF that exceed the County's Noise Element thresholds can and will be mitigated and the increases in the ambient noise levels resulting from TSF will likely create insignificant impacts in adjoining areas (SLOC 2009a).

Staff recently visited a small PV solar plant similar to the proposed TSF, adjacent to the CPP (SMUD Cosumnes Power Plant), located in a quiet rural area in Sacramento County. At the time of this visit, the PV plant was in full operation. Standing within the property line of this PV plant, approximately less than two-hundred feet away from the transformers and inverters, staff could not notice any plant-related noise (from the transformers, the inverters, or otherwise). This lent staff assurance about the relative quietness of the PV technology.

Therefore, although staff does not have predicted noise levels for the TSF project at the most-affected receptors, due to the relative quietness of the PV technology, staff believes that CESF in combination with the TSF project is not likely to create significant cumulative impacts during operation.

However, to ensure this, staff proposes Condition of Certification **NOISE-10**, which requires noise surveys, if necessary, to determine CESF's contribution to cumulative impacts. This condition of certification further requires mitigation measures in the event the surveys show that CESF in combination with TSF causes a significant impact. Because no predicted noise levels for TSF are available and to ensure compliance, this condition of certification requires the determination of both, a significant cumulative impact, and the noise reduction needed to achieve compliance, to be based on these surveys and in cooperation with the staff. To demonstrate what would constitute a significant cumulative impact in terms of actual project noise levels, staff has included examples in Condition of Certification **NOISE-10** for some possible scenarios that may occur.

According to the applicant, construction of these two projects would likely overlap for a period of approximately one to two years (CESF 2008j). During a portion of this period, construction work at the southern portion of the TSF project site would likely overlap

with construction work at the northern portion of the CESF project site. During this temporary period, the combined unmitigated construction noise from these projects would substantially elevate the ambient noise levels at ML3, Strobridge, and Reyes. However, staff's proposed conditions of certification related to the CESF construction activities, **NOISE-2**, **NOISE-6**, and **NOISE-7**, will ensure that the CESF's contribution to cumulative impacts is not cumulatively considerable.

SunPower California Valley Solar Ranch project would be located at least 6 miles away from the CESF site, too far to cause cumulative noise impacts when combined with the CESF project.

Staff is not aware of any other projects which, when combined with the CESF project, would create direct cumulative noise impacts in the project area.

FACILITY CLOSURE

All operational noise from the project would cease when the CESF project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated - that is, noisy work could be performed during daytime hours with machinery and equipment that are properly equipped with mufflers. Any noise LORS in existence at that time would apply. Unless modified, applicable conditions of certification included in the Energy Commission decision would also apply.

PUBLIC AND AGENCY COMMENTS

Public comments made on the PSA relative to **Noise and Vibration** are generally responded to in the body of the text of this analysis and summarized below.

Members of the public submitted several comments regarding **Noise and Vibration** as described by the PSA. Staff has reviewed those comments and incorporated appropriate revisions. The following text summarizes the staff's responses to those comments.

COMMENTS FROM ROBIN BELL (PUB 2008J) AND STAFF'S RESPONSES TO THOSE COMMENTS

1. P. 4.6-12 of the PSA, 3rd paragraph under **Compliance with LORS**, states the applicant commits to performing noisy construction work during the hours of 7:00 am to 7:00 p.m. Monday through Friday. Condition of Certification **NOISE-6** however states noisy construction work is restricted to 7:00 a.m. and 9:00 p.m. Monday through Friday and 8:00 a.m. to 5:00 p.m. Saturday and Sunday. Also, there is no level established for *noisy construction*. Please define noisy construction as 5-10 dBA above existing ambient sound levels at sensitive receptors. Please limit noisy construction to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday. Since

construction of the CESF will take three years, it is imperative to the health and welfare of local residents that they receive days off from noise impacts of the CESF construction and are able to enjoy their homes and property in peace and quiet a few days of the week.

Staff's Response: To further mitigate the impact of construction noise, staff has revised the limits in Condition of Certification **NOISE-6** to require construction work to end at 7:00 p.m. instead of the originally proposed 9:00 p.m. to provide some relief for the residents. The time restrictions in this condition of certification are in compliance with the San Luis Obispo County Land Use Ordinance. Staff considered disallowing construction on weekends, but, because this would expose the people living in the project area to construction noise for approximately 10 months longer, beyond an already long period of 35 months, staff recommends construction to be allowed on weekends, 8:00 a.m. to 5:00 p.m.

Noisy construction refers to any construction noise that can potentially draw legitimate complaints. Staff has added this definition to Condition of Certification **NOISE-6**. As described under **Construction Impacts and Mitigation**, **CEQA Impacts**, typically during construction, construction workload, equipment roster, work schedule, and work locations are constantly changing. Each construction activity typically moves along at a rapid pace, lasting only a few days. Thus, the level and character of the noise produced during construction are almost always changing. As shown in **Noise Figure 5** through **Noise Figure 13**, the CESF's construction noise will not be constant throughout the construction period. (This is typical of any major construction project.) Therefore, and based on staff's experience with past power plant projects, it is not practical to require the project to meet specific noise level limits for construction. Requiring such limits would require construction noise to be constantly measured at all of the nine identified noise-sensitive receptors to ensure those limits are not exceeded at any given time, because the measurements taken one day may not necessarily apply to the activities of the next day, the next week, or the next month. However, staff has added additional requirements to Condition of Certification **NOISE-2** to more actively involve staff in the complaint resolution process.

Noise Figure 5 through **Noise Figure 13** also show that where the unmitigated noise is expected to result in an increase of more than 10 dBA throughout most of the construction period, such an increase would be limited to only several months, through the implementation of the mitigation measures (Scenario 2 or 3). Please also note that even though these figures show that the unmitigated construction noise would result in less than a 10 dBA increase at several receptors, the required mitigation measures in Condition of Certification **NOISE-7** would effectively reduce the noise at those receptors, as well. The applicant's latest noise level predictions provide some assurance for staff that the project's mitigation measures described in the DNMP can, in fact, reduce the noise to levels that would not cause disturbance for a long period of time. Staff has proposed Condition of Certification **NOISE-7**, which will require effective construction barriers and/or equipment engine noise suppression upgrades as described in the DNMP to be implemented during the entire construction period. Additionally, should construction noise cause significant disturbance, Condition of Certification **NOISE-2** would allow the affected person(s) to

file a complaint. The complaint, then, must be resolved according to the procedures described in Condition of Certification **NOISE-2**. Resolving construction-related noise issues through this complaint resolution process has proven to be effective and workable.

For typical power plants, staff normally considers construction activities that result in ambient noise levels that are more than doubled to be less than significant due to their relatively short construction period. (An increase of 10 dBA is equivalent to doubling the noise level.) However, due to the long construction period for the CESF and because the CESF project would be located in a very quiet environment, construction noise resulting in more than doubling the ambient levels at the residences near the proposed CESF project site for as long as 35 months would have the potential to significantly disturb the residents living near the project site. Therefore, staff considers an increase of more than 10 dBA in the ambient noise levels at the project's noise sensitive receptors to create significant impacts. Staff believes this is an appropriate standard for construction, because construction will be limited to the daytime hours and the mitigation measures proposed in the DNMP would effectively reduce the impacts for the majority of the construction period. The 5-10 dBA standard that staff applies to operational noise is not appropriate, given the shorter period of time (3 years versus 30 years) and the fact that construction will be limited to during the day time hours.

2. It is not appropriate to evaluate nighttime noise impacts from inside a home. This assumption limits a person's use of both their home and their property. Our bed is located against a large window and adjacent to large French doors and in summer we sleep with both doors open to enjoy the cool summer nights. From experience, I can assure you that with this amount of open space and the location of the bed, the sound is no different inside than out. No persons should have to close their windows or change their sleeping arrangements to meet your expectations. Additionally, you limit the ability of a resident to enjoy outdoor sleeping quarters and outdoor entertainment areas. It is not appropriate to limit a person's nighttime use of their property to inside their home. The nighttime noise impacts to residences need to be limited to 5 dBA.

   Staff's Response: The PSA considered a 10 dBA increase at night to result in a less-than-significant impact if it resulted in no more than 40 dBA at the affected receptor. This conclusion was based on the fact that people are typically indoors at night. From the public comments received to date, staff has learned that the people living in the project vicinity typically spend a lot of time outdoors at night, including sleeping outside during the warm seasons of the year. Because people will likely be trying to sleep outdoors during late night and early morning, as opposed to engaging in typical daytime outdoor activities, an increase of 10 dBA in the exterior nighttime ambient levels would cause significant disturbance. Staff has revised the threshold of significance to 5 dBA above the ambient (please see **Noise Table 11**).

3. Staff states the initial sound test will take place on a cold calm winter morning in order to measure the CESF noise impacts with an inversion layer present. If the

inversion layer does not occur as expected on the test morning and if is apparent to local residents that the CESF sounds do in fact "bounce" when an inversion layer is present, sound tests must be performed again when the sound actually bounces.

Staff's Response: Condition of Certification **NOISE-2** will allow the local residents to file a complaint anytime it is apparent to them that the project is louder than expected. This condition of certification has been successfully used to resolve project noise complaints in the past, and staff is confident it will do so in this project. Additionally, staff has revised Condition of Certification **NOISE-4** to require the noise monitoring to be performed twice, as opposed to once typically required for the power plants under the Energy Commission's jurisdiction, to try to capture the effects of inversion or other weather-related effects.

4. There is no noise limit set for pile driving. Even though a *quieter* method is requested, without specific noise restrictions imposed, there still may be a significant impact to nearby residents. If the quiet pile driving will be higher than 10 dBA above existing ambient noise at the receptors listed in Condition of Certification **NOISE-4**, please require the CESF to limit pile driving to no more than four consecutive hours a day between the hours of 7:00 am and 5:00 pm. And, please set a noise limit for this pile driving which assures the neighbors' health and well being.

   Staff's Response: In the DNMP, the applicant states that it has revised the allocation of the project's construction equipment on a monthly basis, which has included elimination of pile driving (CESF 2009a, §3.1.2.2.4). In the PSA, staff proposed a condition of certification to require pile driving to be performed using a quieter process than the traditional pile driving techniques (Condition of Certification **NOISE-7** in the PSA). Because pile driving will not occur, staff has deleted this condition. To ensure pile driving will not occur, however, staff has added a requirement to Condition of Certification **NOISE-6** disallowing this activity.

5. I am concerned about the noise pollution of steam blows and its effect on nearby residents. They should not affect nearby residents' use of their property or their health and well being. Please limit their noise to a responsible level. If there is any question on the potential impact to residents, please require the CESF to provide a schedule of steam blows to local residents so we may plan accordingly. Please also require the CESF to limit the steam blows to no more than four consecutive hours a day, limit the blows to the hours of 7:00 am to 5:00 pm and please require a reasonable time limit between blows such as once every fifteen minutes so they do not become continuous high level noise pollution.

   Staff's Response: As seen in **Noise Table 9**, the continuous low pressure method would result in an increase of less than 10 dBA in the ambient level at each sensitive receptor, while the high pressure method would result in more than 10 dBA increase in the ambient levels at two of the receptors. Therefore, staff proposes Condition of Certification **NOISE-8**, which will require the employment of the low pressure steam blow method. This condition also will require the steam blow noise not to result in more than 10 dBA increase in the ambient levels, and will require a notification be sent to the project neighbors describing the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that

it is a one-time activity and not a part of normal plant operations. Also, this condition will require the project owner to measure the noise levels from this activity to ensure compliance. The low pressure steam blow will occur only once, continuously for a period of about 36 hours.

6. The CEC sound consultant, Jim Buntin, compared the noise potential of the TSF transformers to washing machines and stated that two washing machines would not be significantly louder than one; however, fifty washing machines would indeed be significantly louder than one. Given that the TSF will have a transformer every five acres and be very close to both the Reyes and Strobridge residences, there may in fact be impacts to these homes. The cumulative impacts of the CESF and TSF on these residences should be analyzed.

   Staff's Response: As explained under **Cumulative Impacts and Mitigation**, according to the CUP (Conditional Use Permit) for the TSF project, the noise from the transformers and inverters within the TSF project footprint will not likely be discernable at more than one-hundred feet from the project site boundaries (Topaz 2008). Staff's conclusion is consistent with that reached by San Luis Obispo County for the TSF project (SLOC 2009a).

   Although staff does not have predicted noise levels for the TSF project at the most-affected receptors, due to the relative quietness of the PV technology, staff believes that CESF in combination with the TSF project is not likely to create significant cumulative impacts during operation. However, to ensure this, staff proposes Condition of Certification **NOISE-10**, which requires mitigation measures in the event CESF in combination with TSF causes a significant impact.

7. The predicted constructed noise levels at the Bell Exisitng Residence are shown in the PSA. Please consider that if more construction truck traffic is redirected onto Bitterwater Road due to requests made in Traffic and Tansportation (Pg. 4.10-20, #1) the construction noise level may dramatically increase at this residence. Please verify that new noise construction predictions are developed to reflect any changes in the transportation plan.

   Staff's Response: As described in the CESF Post-PSA Draft Traffic Mitigation Plan, Bitterwater Road will only be used for time critical project loads in the event SR-58 is closed. Therefore, the noise impacts of project-related truck traffic on Bitterwater Road will be insignificant. Please see **Traffic and Transportation** section of this document for further discussion.

COMMENTS FROM MIKE STROBRIDGE (PUB 2008F) AND STAFF'S RESPONSES TO THOSE COMMENTS

8. On November 8th, 2008 I sent the CEC a letter with a document attached expressing my extreme concern with the noise of the proposed industrial site and the effects on my family's health and my communities. I strongly disagree with the CEC's remarks that the noise level can be mitigated to deviate from any health related issues stemming from the given decibels by URS and the CEC. Noise

pollution can cause annoyance and aggression, hypertension, high stress levels, tinnitus, hearing loss, sleep disturbances, and other harmful effects. According to the World Health Organization (WHO), health should be regarded as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (WHO 2001). Under this broad definition, noise-induced aggravation is an adverse health effect. As with any psychological reaction, annoyance has a wide range of individual variability, which is influenced by multiple personal and situational factors (Fields 1993, Broadbent 1972). The proposed plant is a situational factor that is affecting the health and welfare of a community. In the **Noise and Vibration** section of the PSA only three residents are being addressed; yet approximately there are 16 residential homes between my residence (Strobridge) and the Bell residence. According to the CEC's findings this "situational" factor will bring noise levels causing significant noise impacts on the community surrounded by the affected vicinity during both construction and operation. My findings have been dismissed without any supporting documentation to prove otherwise. To summarize my concerns, I will acknowledge that I am not an Acoustical Engineer, but I am a Certified Technician in noise suppression, refrigeration systems, and electrical diagnostics and work daily with excessive noise conditions that have to be regulated by the EPA. To reiterate, the PSA includes no scientific knowledge of the surrounding area and affects the atrocious proposed noise polluting industrial site will have on the public.

Staff's Response: The document referenced by Mr. Strobridge discusses the adverse health effects of exposure to excessive noise (Strobridge 2008). This document concludes that exposure to loud noise can cause serious health problems. Staff does not dismiss the findings in the document referenced by Mr. Strobridge, but, it believes the requirements embedded in this FSA and the mitigation measures proposed in the DNMP will mitigate the noise impacts to well below the levels that typically cause the serious adverse health effects discussed in that document. Although project operation would likely elevate the noise levels at Mr. Strobridge's home, the expected 4 dBA increase at night and 6 dBA increase during the daylight hours in the exterior noise levels at his property would result in exterior levels of less than 30 dBA (typical of a quiet bedroom) at night and less than 40 dBA during the daylight hours. During construction, the exterior noise level at this residence would likely be 40-46 dBA (50 dBA is the typical noise level in a private business office).

Staff has evaluated the project's noise impacts at all the identified receptors in the vicinity of the project site. Staff notes that the mitigation measures proposed in the following conditions of certification would provide benefit to anyone present in the project area. If the project proves to be out of compliance with the specified limits, additional mitigation measures would include retrofitting the project features, erecting sound barriers, or operating the plant at less than full output. These measures would effectively reduce the noise heard by anyone in the area.

9. The CEC states that the only noise from the Topaz Industrial Project would include transformers and invertors. These would be located in the center of each photovoltaic block or within the TSF project substation, relatively far away for the CESF project's noise-sensitive receptors. Staff believes that the TSF's major sources of noise would be sufficiently far away from these receptors that they would

not create significant impacts when combined with the CESF project noise. This information is erroneous; the TSF is located on three sides of my home; set back only 30 feet from my fence line. TSF will have an inverter block every five acres; these blocks produce from 56-42 dBA during the day and 56-38 dBA at night (see attached noise contour sheets from OptiSolar's SLO Counties Application). These contour sheets are from OptiSolar's Sarnia Industrial Site which is only a 40 MW which is drastically smaller than the proposed 550 MW site. There will be approximately 32 inverter blocks directly on or just behind my property line on three sides. Per the SLO County application sent in by OptiSolar the two sites construction will overlap in the vicinity of the CESF- it states that construction on TSF will begin first in the non-Williamson Act land- which will be located in Sections 20, 21, and 22. My home is located in Section 21- 2800ft. from the CESF site. When you add Cumulative noise impacts from TSF dBA, levels will be well over the predicted operational maintenance and construction levels, which would make CESF not able to mitigate noise at my residence (Strobridge). For example, nighttime maintenance alone on the CESF Site is 10 dBA over the ambient. Moving CESF any farther south would result in larger noise impacts to other residents such as SR10 which is a residence not a location. Taking that into consideration, and taking the fact that OptiSolar stated maintenance will also be done during the night it clearly shows that Cumulative Impacts need to be evaluated.

Staff's Response: As explained under **Cumulative Impacts and Mitigation**, even though the Sarina project would be considerably smaller in size than the TSF project, the number of transformers and inverters per unit area of occupying land would be similar for both projects.

Therefore, although staff does not have predicted noise levels for the TSF project at the most-affected receptors, due to the relative quietness of the PV technology, staff believes that CESF in combination with the TSF project is not likely to create significant cumulative impacts during operation. Staff's conclusion is consistent with that reached by San Luis Obispo County for the TSF project (SLOC 2009a).

However, to ensure compliance, staff proposes Condition of Certification **NOISE-10**, which requires mitigation measures in the event CESF in combination with TSF causes a significant impact.

According to the applicant, construction of these two projects would likely overlap for a period of approximately one to two years (CESF 2008j). During this period, the combined unmitigated construction noise from these projects would substantially elevate the ambient noise levels at some of the identified residential receptors. However, staff's proposed conditions of certification related to the CESF construction activities, **NOISE-2**, **NOISE-6**, and **NOISE-7**, will ensure that the CESF's contribution to cumulative construction impacts is not cumulatively considerable.

For further discussion, please see **Cumulative Impacts and Mitigation**.

10. It is absurd and I am enraged that assumptions about my sleeping patterns and my interior noise levels are being decided without proper research! First I would like to state that my living standards are within my constitutional privacy rights but I will explain just a few of your ridiculous theories. The Carrisa Plains is a rural area with a different way of life than an area such as Sacramento or Palo Alto, I am up every morning at sunrise to feed animals and prepare my day. Summer is a time enjoyed outdoors on the plains. I spend my evenings and nights in the crisp non-polluted air enjoying the clear night skies free from light pollution and noise- after taking in the breathtaking views of a sunset with my family. It is my right as a tax paying American to be able to enjoy my property day or night. According to this section my family must be inside at night to avoid any noise pollution. This is in direct violation of my constitutional rights. I believe it is only fair since assumptions are made about interior noise in my home to see sufficient data supporting your interior noise findings in a rural environment and prove that they do not violate my constitutional rights as a property and home owner in any way. I am unclear why the only reference material used by the CEC is from another county besides San Luis Obispo.

    Staff's Response: The PSA considered the 10 dBA at Strobridge to result in a less-than-significant impact during the nighttime hours. This conclusion was based on the fact that people are typically indoors during those hours. From Mr. Strobridge's comments on the PSA and from other residents living near the project site who spoke to this effect at the PSA Workshop, staff learned that the people living in the project vicinity typically spend a lot of time outdoors during those hours, including sleeping outside during the warm seasons of the year. Because people will likely be trying to sleep outside during late night and early morning, as opposed to engaging in typical daytime activities, an increase of 10 dBA in the existing nighttime ambient level would cause significant disturbance. In order to reduce the impact to 5 dBA above the ambient, staff proposes requirements that include a noise complaint resolution process (**NOISE-2**), noise level limits to ensure the 5 dBA threshold will not be exceeded during the nighttime maintenance work (**NOISE-4**), and the use of a quieter reflector cleaning vehicle and lighting plant (battery-powered instead of conventional internal-combustion-powered vehicle and lighting plant) for the nighttime maintenance work (**NOISE-9**).

11. The CEC states that the projects noise environment is very quiet. Thus, staff considers an increase of between 5 and 10 dBA in the ambient level, resulting from project operation, to be significant if the project plus ambient noise level is above 40 dBA at the Strobridge residence. This is unacceptable. Ambient noise at my property is 33 dBA. Why is a 7 dBA increase acceptable at my home but an increase of 5 dBA is all that is allowed at all other sensitive receptors? I am a tax paying home owner who deserves equal consideration. I strongly believe the CEC is giving Ausra preferential treatment. There should only be 5 dBA increase at my home just like all other residences. Anything else is subject to prejudice. If Ausra cannot meet the sound requirements- perhaps they should relocate to an appropriate location such as Harper Lake. I demand an explanation as to why louder noise pollution is acceptable at my home compared to other sensitive noise receptors.

Staff's Response: **Noise Table 10** shows that the project's operational noise level of 38 dBA at Strobridge, when combined with the ambient noise level of 33 dBA L_{eq} at this location, would result in 39 dBA L_{eq}, 6 dBA above the ambient, and 3 dBA lower than previously expected in the PSA. Staff considers an increase of 5-10 dBA during the daytime to be less than significant, if the resultant level is no more than 40 dBA. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. Therefore, an increase of 6 dBA at Mr. Strobridge's residence is considered less than significant because operation would not occur during the late night and early morning hours when people are trying to sleep and because the resulting noise level is lower than 40 dBA. Staff limits project noise to cause no more than a 5 dBA increase in the ambient levels for the nighttime maintenance activities. Staff notes that these standards apply to all the identified sensitive receptors. **Noise Table 10** shows that based on the results of the noise modeling, the increases at the other residences will be 0-4 dBA, while the increase at Strobridge would be 6 dBA. This is because Mr. Strobridge's home would be the nearest receptor to the power block. Had the expected daytime increases at the other residences been 5-10 dBA and had they resulted in noise levels of no more than 40 dBA for daytime operation, staff would have considered the impacts less than significant, as well. For further discussion, please see **Operation Impacts and Mitigation**, **CEQA Impacts**.

Staff has not given the applicant any preferential treatment. In fact, because of the overwhelming public concerns and because staff recognizes the high sensitivity of the people living in the area to industrial noise, staff has proposed additional conditions of certification and additional requirements within those conditions, including additional noise monitoring, beyond what it normally proposes for power plant projects, as well as utilized a more stringent threshold of significance for daytime noise than has been utilized previously.

12. The CEC states that the project is located in a quiet rural setting within a basin called the Carrizo plain. CEC also states that temperature inversion can occur in such a setting. I do not agree with CEC's opinion that the CESF must be in operation to evaluate Temperature Inversion. I have firsthand experience with Temperature Inversion in the Carrizo Plains. I have repeatedly told the CEC at the workshop meetings of being able to hear my neighbors' small radio over 1.5 miles away in the mornings. Gordon Hayes has told me he can hear my dog barking in the morning over 3 miles away. Temperature Inversion is a common situation in the Carrizo Plains and can take place in both summer and winter mornings. I would like to refer to the PSA document 4.7-7, Meterology, "Strong atmospheric temperature inversions frequently occur especially in the late mornings and early afternoons". I firmly agree with Obed Odoemelam, Ph. D. Temperature Inversion frequently occurs in the Carrisa Plains. Since documentation is contradicting within the PSA findings I assure you that this phenomenon needs to be studied before the plant is in operation- as it could tremendously increase the noise at my home and other sensitive receptors.

Staff's Response: Staff agrees that temperature inversion, and other weather-related effects that can elevate sound levels, occur in the project area. Therefore, in Condition of Certification **NOISE-4**, staff recommends a 25-hour ambient noise survey to be performed during two different times of the year, once during a cold and cloudy day, to try to capture the effects of inversion, and once during a late spring, summer, or early fall day, to capture the potential effects of other weather-related conditions. If either survey shows noncompliance, Condition of Certification **NOISE-4** will require the noise to be reduced to a level of compliance by requiring the applicant to employ additional mitigation measures. Staff does not list specific mitigation measures in the conditions of certification for project operation, but the conditions of certification require that additional measures be implemented, as acceptable to the CPM.

Additionally, Condition of Certification **NOISE-2** will allow for a complaint resolution process for up to one year after the project has become operational. If any noise complaint results in the need to conduct another noise survey, this would provide yet another opportunity to try and capture those weather-related effects.

Based on staff's experience with past power plant projects, staff believes reasonably feasible mitigation measures are available to achieve compliance. It is typically more effective to add mitigation measures after the power plant has become operational, when one can better understand the characteristics and source(s) of the excessive noise. Examples of these measures are installing additional sound insulation on the noisiest equipment, erecting additional sound walls around such equipment, and operating the plant at a lower power output.

Operating the plant at a lower-than-full power output may result in meaningful noise reduction. On cold winter days (when strong inversion may be present), the project would likely operate at lower than full-power output due to lack of sufficient solar insolation. The air-cooled condensers would not need to operate at full load due to the low air temperatures (cold air provides a better cooling effect than warm air). Thus, fewer condenser cooling fans would likely operate at this time resulting in reduction in the project's overall noise level. This may be sufficient to reduce the project's impacts to less than significant. If not, additional measures must be implemented to achieve this.

Operating the plant at a lower-than-full output could also be an effective mitigation measure during the times when solar insulation is plentiful (sunny spring, summer, and fall days). The amount of reduction in output can be adjusted to achieve the desired noise reduction.

An effective mitigation measure can be blocking the noise from the air-cooled condenser fans by installing noise barriers or sound absorptive material on the condenser units. Such mitigation options are practical measures often used to reduce condenser fan noise.

Staff has successfully used the methods described in the conditions of certification in numerous past power plant projects and is confident they will be adequate to resolve any potential noncompliance-related issues for the CESF.

COMMENTS FROM BOLLARD ACOUSTICAL CONSULTANTS (BAC) IN REPRESENTING MIKE STROBRIDGE (BAC 2009) AND STAFF'S RESPONSES TO THOSE COMMENTS

13. It is unclear to me why there is such a large disparity between the ambient noise measurement data collected at the Strobridge Residence by URS, and the data collected by Brown-Buntin Associates, Inc. (BBA). I am in full agreement with the CEC staff, however, that the BBA results should be utilized to establish baseline conditions at the Strobridge Residence, and not the URS data. The disparity does, however, call into question the validity of other aspects of the noise analysis prepared by the applicant's consultant. BAC also states that the noise from the air-cooled condenser unit at the Strobridge residence would likely be 9 decibels higher than the level predicted in the mitigation plan.

    Staff's Response: Staff has not used the results of the applicant's noise surveys. In the PSA staff used the BBA's data to evaluate the project's noise impacts at all the identified sensitive receptors. In this FSA, staff also uses the results of the BBA's ambient noise survey, summarized in **Noise Table 8,** for all the identified sensitive receptors, including Strobridge.

    Although the applicant's latest noise modeling shows the project's operational noise impacts to be less than significant at the project's noise-sensitive receptors, staff has not relied on the applicant's modeling in concluding that the project will not create significant adverse impacts. Furthermore, staff has used the same performance standard regardless of the applicant's noise level predictions from either modeling. Staff has proposed the following conditions of certification to ensure that regardless of the level of accuracy of the noise modeling, the project would create less than significant impacts, even in the event that the project initially fails to meet the proposed noise level limits.

    If noise reduction is needed, mitigation measures such as installing barriers and sound absorptive material on the condenser units, operating the plant at lower-than-full power output, or a combination of these measures are some examples of feasible and effective options.

14. I concur with CEC staff that noise level increases of less than 5 dB would not likely result in significant noise impacts, but because the project would introduce a new source of noise into the community, I believe that any increase in excess of 5 dB increase may be significant. In light of this belief, the CEC staff recommendation of using a 6 dB threshold is not unreasonable.

    Staff's Response: Staff considers an increase of 5-10 dBA during the daytime to be less than significant, if the resultant level is no more than 40 dBA. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. Therefore, an increase of 6 dBA at Mr. Strobridge's residence is considered less than significant because operation would not occur during the late night and early morning hours when people are

trying to sleep and because the resulting noise level would be lower than 40 dBA. Staff limits project noise to cause no more than a 5 dBA increase in the ambient levels for the nighttime maintenance activities.

15. If the applicant is suggesting eliminating the **NOISE-4** requirement due to their newly modeled levels, then the modeling accuracy is crucial. I would strongly suggest that the conditions of **NOISE-4** remain intact, as it is the only assurance Mr. Strobridge has that Carrizo will be required to continue to mitigate until the noise levels at the Strobridge residence are satisfactory.

    Staff's Response: Staff has no intention of eliminating **NOISE-4**. This condition will require the project to meet the thresholds of 6 dBA for daytime and 5 dBA for nighttime at Strobridge.

16. BAC concludes that the applicant should seriously consider relocating the power block to the center of the site. Should, for example, follow-up acoustic testing indicate that the power block noise generation noise exceeds the projects performance standards at the Strobridge residence, thereby requiring very costly acoustic retrofits, the opportunity to relocate the power block to the center of the site will have been lost.

    Staff's Response: Staff agrees with this conclusion and as explained above, it considers the relocation to be an effective mitigation measure. Even though the DNMP demonstrates that operational noise would likely pass compliance, staff encourages the applicant to consider relocating the power block to or near the center of the site. If the power block is built at the location currently proposed and the project proves to be out of compliance during operation at the nearest receptors, the opportunity to take advantage of the noise reduction effect of relocating the power block will have been lost.

    Staff believes moving the power block to or near the center of the site would not contribute significantly to increases in the ambient noise levels at the sensitive receptors located to the south/southwest of the site (LT1 and SR10) due to their relatively high existing ambient levels, 47-50 dBA (**Noise Table 6**).

    However, staff is confident that retrofitting the project features to bring the project into compliance is both effective and practical regardless of the power block location. The difference will be the higher cost of retrofitting the project with the power block at the currently proposed location, as opposed to the center of the site. Regardless of the power block location, Condition of Certification **NOISE-4** will require the project to meet the limits specified therein.

17. BAC comments that the 60-foot tall permanent sound barriers considered by the applicant will not be effective in reducing the noise at Strobridge.

    Staff's Response: Staff agrees. This sound barrier would reduce the project noise only by 1 dBA at this location. If the project proves to be out of compliance by more than 1 dBA, this mitigation alone would not reduce the impacts to less than

significant; further mitigation would be necessary. Additionally, due to seismic concerns, staff does not consider this barrier to be a feasible mitigation option.

COMMENTS FROM SAN LUIS OBISPO COUNTY (SLOC 2008H) AND STAFF'S RESPONSES TO THOSE COMMENTS

18. The County suggests employment of construction sound barriers near any affected receptor(s).

    Staff's Response: Staff believes sound barriers erected near the noise source and equipment engine suppression upgrades are more effective than erecting barriers near the receptors due to dispersion of sound with distance; staff has required these measures in Condition of Certification **NOISE-7**.

19. Revise the Monday through Friday end time from 9:00 p.m. to 7:00 p.m. for all construction activities (including pile driving and steam blow piping) to provide some evening quiet time.

    Staff's Response: Staff has revised Condition of Certification **NOISE-6** to require normal construction to end at 7:00 p.m., rather than 9:00 p.m. as stated in the PSA. The end time for concrete pouring for foundations would remain 9:00 p.m. because this activity may not be feasible during hot summer days, when the concrete mix temperature is not suitable for pouring. This activity will be short-term and temporary. Pile driving will not be needed for this project; staff has added a requirement to Condition of Certification **NOISE-6** to disallow this activity. A one-time continuous low pressure steam blow will be used lasting about 36 hours; no time restriction will be required.

20. The County comments that staff should require noise readings to ensure proper assembly/placement of sound walls.

    Staff's Response: The staff's proposed conditions of certification will ensure project compliance. These conditions will require noise monitoring at each of the noise sensitive receptors. The responsibility of proper installation of any sound wall will be carried by the applicant and its contractor. If any of the noise surveys required by these conditions show the project to be out of compliance, it would be the applicant's responsibility to work with its contractor to address any potential installation problems.

21. The County requests that staff require back-up beepers for all equipment/vehicles be adjusted to their lowest levels possible and still meet OSHA requirements.

    Staff's Response: Staff has added this to Condition of Certification **NOISE-6**.

22. The county comments that workers should be made aware of the surrounding residences and employ respectful practices (radios kept on low volumes, avoid using vehicle horn, etc.).

Staff's Response: Staff has added a requirement to this effect to Condition of Certification **NOISE-6**.

23. It does not appear the impacts of construction trucks along the haul route (namely Bitterwater Road) have been analyzed.

    Staff's Response: As described in the CESF Post-PSA Draft Traffic Mitigation Plan, Bitterwater Road will only be used for time critical project loads in the event SR-58 is closed. Therefore, the noise impacts of project-related truck traffic on Bitterwater Road will be insignificant. Please see **Traffic and Transportation** section of this document for further discussion.

APPLICANT COMMENTS

The applicant submitted several comments regarding **Noise and Vibration** as described by the PSA (CESF 2008t). Staff has reviewed those comments and concludes that they do not result in any changes to staff's findings and conclusions. Staff does not believe further responses to those comments are necessary.

CONCLUSIONS

In this analysis, staff has addressed both construction and operation impacts during the daytime and nighttime.

Staff concludes that the CESF project, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS.

Staff also concludes that the project would produce no significant adverse noise impacts on people within the affected area, directly or indirectly. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that combined with the staff's proposed conditions of certification would avoid any significant adverse impacts.

Based on the relative quietness of the PV technology proposed for the TSF, staff believes the CESF in combination with the TSF project is not likely to create significant cumulative impacts. However, staff proposes Conditions of Certification **NOISE-2** and **NOISE-10** to ensure that the CESF's contribution to cumulative impacts is not cumulatively considerable.

In this FSA, staff has used its own data to represent existing ambient noise levels, in evaluating the project's noise impacts. These levels are the results of the data gathered by staff in its September 2008 noise survey.

Staff has reviewed the DNMP and recognizes that the applicant has included the results of a detailed project-specific noise modeling to predict the project's impacts at the noise-sensitive receptors.

Based on the staff's evaluation of the DNMP, staff believes that construction impacts at the project's most noise-sensitive receptors can be mitigated to less than significant, resulting in no more than 10 dBA increase in the existing ambient levels for the majority of the construction period, by employing practical and effective mitigation measures, such as those listed in the DNMP (CESF 2009a, p. ES-5, §§3.1.3.1, 4.1). Employment of equipment engine noise suppression upgrades and installation of construction noise barriers as described in the DNPM and as required by Condition of Certification **NOISE-7**, and the implementation of Conditions of Certification **NOISE-1**, **NOISE-2** (noise complaint resolution process), **NOISE-6** (restriction on hours of construction and disallowing unnecessary noise), and **NOISE-8** (steam blow noise limits) will ensure that construction activities will create less than significant impacts at the noise-sensitive receptors.

The DNMP also offers several practical and effective mitigation measures to reduce the noise impacts of the project's nighttime maintenance activities (CESF 2009a, §§3.2.5.6, 4.2.2, Table 14). Employment of the electric-powered reflector cleaning crew vehicle and battery-powered lighting plant described in the DNPM (instead of the conventional internal-combustion-powered vehicle and lighting plant proposed in the AFC) as required by Condition of Certification **NOISE-9** and the implementation of Conditions of Certification **NOISE-1**, **NOISE-2** (noise complaint resolution process), and **NOISE-4** (noise level restrictions at the noise-sensitive receptors) will ensure that the nighttime maintenance activities will create no more than a 5 dBA increase in the noise levels at the noise-sensitive receptors, which staff considers to be a less than significant impact.

In light of the mitigation options listed in the DNMP and the proposed conditions of certification, staff believes the noise impacts of project construction and maintenance activities will be mitigated to less than significant.

Even though the applicant's latest noise modeling shows the project's operational noise impacts to be less than significant at the project's noise-sensitive receptors (CESF 2009a, Table ES-1), staff has not relied on the applicant's modeling to conclude that the project is compliant. Instead, staff proposes the following conditions of certification to ensure compliance.

Based on staff's experience with past power plant projects, staff believes feasible additional mitigation measures are available to achieve compliance, if necessary. Examples of these measures include installing additional sound insulation on noisy equipment and erecting additional sound walls around such equipment (i.e., transformers, various pumps and fans, air-cooled condenser unit, and air compressors).

Staff, in Condition of Certification **NOISE-4**, recommends the ambient noise survey to be performed during two different times of the year, once during a cold and cloudy day, to capture the effects of inversion, and once during a late spring, summer, or early fall day, to capture the potential effects of other weather-related conditions. If either survey shows noncompliance, Condition of Certification **NOISE-4** will require the applicant to employ additional mitigation measures. In addition, Conditions of Certification **NOISE-1** and **NOISE-2** will establish a noise complaint process to resolve any complaints

regarding construction-related noise. If any noise complaint justifies the need for another noise survey, this would provide yet another opportunity to try and capture those weather-related effects.

Staff has successfully used the methods described in these conditions of certification in numerous past power plant projects and is confident they will be adequate to resolve any potential noncompliance-related noise issues for the CESF.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 Prior to the start of ground disturbance, the project owner shall notify all residents within three miles of the center of the project site and one-half mile of the linear facilities, and the Principal of Carrisa Plains School, by mail or by other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours a day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction where it is visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: At least 15 days prior to the start of ground disturbance, the project owner shall transmit to the compliance project manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification. This communication shall also verify that the telephone number has been established and posted at the site and shall provide that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout project construction, operation, and nighttime maintenance activities the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- within one hour of becoming aware of the complaint, contact the CPM by phone, explaining the nature of the complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- within 24 hours of becoming aware of the complaint, conduct an investigation to determine the source of noise in the complaint;
- within 24 hours of completion of the above investigation, contact the CPM by phone or email, explaining the result of the investigation;

- if the noise is project related as determined by the CPM, take all feasible measures approved by the CPM to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant, stating that the noise problem has been resolved to the complainant's satisfaction.

Throughout project operation and nighttime maintenance activities, if it is determined by the CPM that noise monitoring is necessary to resolve the complaint, the project owner shall monitor the plant's operational or nighttime maintenance noise, whichever initiated the complaint, at the affected receptor. If this monitoring shows that the noise due to the plant alone exceeds the noise level limit in Condition of Certification **NOISE-4**, below, at the affected receptor, the project owner shall implement mitigation measures to reduce the noise to a level of compliance with that noise level limit at that receptor.

The resolution of the complaint shall be approved by the CPM.

Verification: Within five days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM, that documents the resolution of the complaint. If mitigation is required to resolve the complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is performed and complete.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit the noise control program to the CPM. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone to exceed an average of 36 dBA measured at or near monitoring location ML1 (8710 SR-58), an average of 34 dBA measured at or near monitoring location ML3 (9368 SR-58), an average of 22 dBA measured at or near monitoring location ML7 (identified in **Noise Figure 2**), an average of 33 dBA measured at or near monitoring location LT1 (Carrisa Plains School), an average of 40 dBA measured at or near monitoring location SR10 (identified in **Noise Figure 2**), an average of 38 dBA measured at or near monitoring location Strobridge (APN 072-051-026), an average of 30 dBA measured at or near monitoring

location Bell Future (APN 072-301-001), an average of 28 dBA measured at or near monitoring location Bell Existing (APN 072-311-004), and an average of 38 dBA measured at or near monitoring location Reyes (9330 SR-58).

Also, the project design and implementation shall include appropriate noise mitigation measures adequate to ensure that nighttime project maintenance activities will not cause the noise levels due to plant maintenance alone to exceed an average of 23 dBA L_{eq} measured at or near monitoring location ML1, an average of 23 dBA L_{eq} measured at or near monitoring location ML3, an average of 11 dBA L_{eq} measured at or near monitoring location ML7, an average of 30 dBA L_{eq} measured at or near monitoring location SR10, an average of 26 dBA L_{eq} measured at or near monitoring location Strobridge, an average of 19 dBA L_{eq} measured at or near monitoring location Bell Future, an average of 16 dBA L_{eq} measured at or near monitoring location Bell Existing, and an average of 27 dBA L_{eq} measured at or near monitoring location Reyes.

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints[4].

A. When the project first attains a sustained output of 95 percent or higher of its rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring locations ML1, ML3, ML7, SR10, LT1, Bell Existing, Bell Future, Strobridge and Reyes or at closer locations acceptable to the CPM in order to measure the power plant's contribution to the exterior noise levels at these receptors. This survey shall be conducted twice; once during a cold winter day when winds are calm, and once during a warm, late spring, summer, or early fall day. These surveys during the power plant's full-load operation shall also include the measurement of one-third octave band sound-pressure levels to ensure that no new pure-tone noise components have been caused by the project.

   The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, that is closer to the plant (for example,

[4] A *legitimate complaint* refers to a complaint about noise that is confirmed by the CPM to be disturbing, caused by the CESF project, as opposed to another source, as verified by the CPM. A legitimate complaint constitutes either: a violation by the project of any noise condition of certification, which is documented by an individual or entity affected by such noise, and which is confirmed by the CPM; or a complaint that is confirmed by the CPM to cause disturbing noise.

400 feet from the plant boundary). This measured level shall then be mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

B. If the results from any of the noise surveys indicate that the power plant average noise levels at the affected receptor sites exceed the values mentioned in this condition of certification during the above-specified time periods, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

C. If the results from any of the noise surveys indicate that pure tones are present, mitigation measures shall be implemented to eliminate those pure tones.

Verification: The first survey shall take place within 30 days (or when otherwise approved by the CPM) from the time the project first attains a sustained output of 95 percent or higher of its rated capacity. If the first survey occurs in late spring, summer, or early fall, the second survey shall take place in the following winter. Alternatively, if the first survey occurs in the winter, the second survey shall take place in the following late spring, summer, or early fall. Within 15 days after completing each of the surveys, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report shall be a description of any additional mitigation measures necessary to achieve compliance with the above-listed noise limits and a schedule, subject to CPM approval, for implementing those measures. When those measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey (conducted after implementation of the above mitigation measures), the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project's attainment of a sustained output of 95 percent or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures to be employed in order to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal/OSHA upon request.

CONSTRUCTION RESTRICTIONS

NOISE-6 1. Heavy equipment operation and noisy construction[5] work relating to any project features shall be restricted to the times delineated below:

Mondays through Fridays:	7:00 a.m. to 7:00 p.m.
Saturdays and Sundays:	8:00 a.m. to 5:00 p.m.

2. Concrete pouring for foundations shall be restricted to the times delineated below:

Mondays through Fridays:	5:00 a.m. to 9:00 p.m.
Saturdays and Sundays:	8:00 a.m. to 5:00 p.m.

3. Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

4. Pile driving shall not occur throughout construction.

5. Adjustable back-up beepers for all construction equipment and vehicles shall be adjusted to their lowest levels possible, provided that OSHA and Cal/OSHA's safety requirements are not violated.

6. Workers shall not produce excessive noise when using personal equipment or operating personal vehicles (i.e., radios shall be kept at low volume, vehicle horns shall be used only when necessarily).

Verification: At least 15 days prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that these restrictions will be observed throughout the construction of the project.

NOISE-7 Prior to the start of project construction, the project owner shall implement effective equipment engine suppression upgrades (Scenario 2 as described in the Draft Noise Mitigation Plan [DNMP]), or erect effective temporary noise barriers (Scenario 3 as described in the DNMP).

[5] *Noisy Construction* refers to any construction noise that can potentially draw legitimate complaints.

If after the above implementation, any noise complaint resolution process per Condition of Certification **NOISE-2** requires the project owner to further reduce construction noise, the project owner shall implement the other Scenario not initially elected, resulting in Scenario 4 (both Scenario 2 and Scenario 3 implemented) as described in the DNMP.

Verification: At least 15 days prior to ground disturbance, the project owner shall transmit to the CPM a letter acknowledging that these requirements will be implemented throughout the construction of the project. In this letter, the project owner shall state that it is ready to implement Scenario 4, when and if necessary.

STEAM BLOW RESTRICTIONS

NOISE-8 The project owner shall employ the low pressure steam blow method. The noise from this activity shall not exceed the levels specified in **Noise Table 12** below, at the receptors listed in this table.

Noise Table 12

Receptor	Low Pressure Steam Blow Limit
ML1	43
ML3	40
ML7	20
SR10	50
LT01	39
Strobridge	42
Bell Future	33
Bell Existing	29
Reyes	45

Prior to steam blow, the project owner shall notify all the residents within three miles of the site of the planned steam blow activity, and the Principal of Carrisa Plains School, and shall make the notification available to other area residents in an appropriate manner. The notification may be in the form of letters, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time activity and not a part of normal plant operations.

Upon the start of the steam blow, the project owner shall measure, for a period of at least one hour, the noise levels from this activity at the receptors listed in **Noise Table 12** to ensure the noise limits in **Noise Table 12** are met.

This measurement may alternatively be made at a location, acceptable to the CPM, that is closer to the plant (for example, 400 feet from the plant boundary). This measured level shall then be mathematically extrapolated to determine the noise contribution of this activity at the affected residence.

Verification: At least 15 days prior to the steam blow, the project owner shall submit to the CPM drawings or other information describing the steam blow method to be used.

Project owner shall notify the residents and the Principal of Carrisa Plains School at least 15 days prior to the steam blow. Within five (5) days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

Within five (5) days of the completion of the steam blows, the project owner shall submit to the CPM a letter attesting that the above noise levels at the above receptors were not exceeded during the steam blows.

NOISE-9 The project owner shall employ electric-powered reflector cleaning vehicle(s) and battery-powered portable lighting plant(s) for the purpose of reflector cleaning. The electric-powered reflector cleaning vehicle(s) shall meet the following specifications (as specified in the Draft Noise Mitigation Plan):

A. Low voltage (under 48V), and

B. Low horsepower (under 10HP).

Verification: At least fifteen (15) days prior to the first reflector cleaning, the project owner shall submit a letter to the CPM attesting that the above-specified vehicle(s) and lighting plant(s) will be employed for the project.

Within five (5) days of the first reflector cleaning, the project owner shall submit to the CPM a statement attesting that the above vehicle(s) and lighting plant(s) have been employed.

CUMULATIVE IMPACTS MITIGATION

NOISE-10

Operation:

If a noise complaint in accordance to Condition of Certification **NOISE-2** justifies a noise survey in order to determine the CESF's daytime contribution to a cumulative noise impact resulting from both CESF and TSF, the project owner shall measure the ambient noise level for a minimum of one hour at or near the affected receptor, under all of the following conditions:

A when both CESF and TSF are in operation at an output of 95 percent or higher of their rated capacity,

B when only CESF is in operation at an output of 95 percent or higher of its rated capacity, and

C when only TSF is in operation at an output of 95 percent or higher of its rated capacity.

The project owner shall compare the results of the above three measurements to determine the CESF's contribution to the cumulative noise impact at the affected receptor. If the survey shows that CESF in combination with TSF causes a significant impact (a significant cumulative impact is defined below), the project owner shall implement mitigation measures to reduce the noise so that the CESF's contribution to this impact is not cumulatively considerable.

A cumulative impact for operation is considered significant if, either, it increases the daytime ambient L_{eq} level at the affected receptor (as specified in **Noise Table 10**) by more than 5 dBA but less than 10 dBA and the resultant noise level is above 40 dBA L_{eq}, or, it increase the daytime ambient L_{eq} level at the affected receptor (as specified in **Noise Table 10**) by more than 10 dBA regardless of the resultant noise level.

Nighttime Maintenance:

If a noise complaint in accordance to Condition of Certification **NOISE-2** justifies a noise survey in order to determine the CESF's nighttime contribution to a cumulative noise impact resulting from both CESF and TSF, the project owner shall measure the ambient noise level for a minimum of one hour at or near the affected receptor, under all of the following conditions:

A when both CESF and TSF are performing mirror washing,

B when only CESF is performing mirror washing, and

C when only TSF is performing mirror washing.

The project owner shall compare the results of the above three measurements to determine the CESF's contribution to the cumulative noise impact at the affected receptor. If this survey shows that CESF in combination with TSF causes a significant impact (a significant cumulative impact is defined below), the project owner shall implement mitigation measures to reduce the noise so that the CESF's contribution to this impact is not cumulatively considerable.

A cumulative impact for the maintenance activities is considered significant if it results in an increase of more than 5 dBA in the nighttime ambient L_{eq} level at the affected receptor (as specified in **Noise Table 11**).

The determination of both, a significant cumulative impact, and the noise reduction needed to achieve compliance, for operation and maintenance activities shall be in cooperation with the CPM.

In absence of predicted noise levels from TSF, the following examples are offered to demonstrate some of the scenarios that could occur and how staff would determine whether or not the CESF's contribution is significant in each scenario. These examples also show that if the CESF's contribution is determined to be significant, what must be the reduction in CESF's noise level in order to bring the project into compliance.

Example 1: Operation

	CESF, dBA	TSF, dBA	Ambient, dBA	Cumulative, dBA	In excess of 40 dBA
Pre-Mitigation	38	38	33	42	2
Post-Mitigation	36 CESF's contribution must not be more than this.	36[1]	33	40	0
Reduction Required by CESF to Achieve Compliance (40 dBA)	2				

[1] If San Luis Obispo County were to apply the same noise threshold as the Energy Commission has applied to CESF, then TSF would be required to reduce the noise level of 38 dBA, by 2 dBA, to 36 dBA, as well.

Example 2: Operation

	CESF, dBA	TSF, dBA	Ambient, dBA	Cumulative, dBA	In excess of 40 dBA
Pre-Mitigation	39	37	33	42	2
Post-Mitigation	36 CESF's contribution must not be more than this.	36[1]	33	40	0
Reduction Required by CESF to Achieve Compliance (40 dBA)	3				

[1] If San Luis Obispo County were to apply the same noise threshold as the Energy Commission has applied to CESF, then TSF would be required to reduce the noise level of 37 dBA, by 1 dBA, to 36 dBA, as well.

Example 3: Operation

	CESF, dBA	TSF, dBA	Ambient, dBA	Cumulative, dBA	In excess of 40 dBA
Pre-Mitigation	37	39	33	42	2
Post-Mitigation	36 CESF's contribution must not be more than this.	36[1]	33	40	0
Reduction Required by CESF to Achieve Compliance (40 dBA)	1				

[1] If San Luis Obispo County were to apply the same noise threshold as the Energy Commission has applied to CESF, then TSF would be required to reduce the noise level of 39 dBA, by 3 dBA, to 36 dBA, as well.

Example 4: Operation

	CESF, dBA	TSF, dBA	Ambient, dBA	Cumulative, dBA	In excess of 40 dBA
Pre-Mitigation	38	34	33	40	0
Post-Mitigation	38 CESF will not be required to mitigate.	34	33	40	0
Reduction Required by CESF to Achieve Compliance (40 dBA)	0				

Example 5: Nighttime Maintenance

	CESF, dBA	TSF, dBA	Ambient, dBA	Cumulative, dBA	In excess of Ambinet, dBA
Pre-Mitigation	26	26	24	30	6 (exceeds nighttime threshold by 1 dBA)
Post-Mitigation	25 CESF's contribution must not be more than this.	25	24	29	5 (complies with nighttime threshold)
Reduction Required by CESF to Achieve Compliance (to no more than 5 dBA above ambient)	1				

[1] If San Luis Obispo County were to apply the same noise threshold as the Energy Commission has applied to CESF, then TSF would be required to reduce the noise level of 26 dBA, by 1 dBA, to 25 dBA, as well.

The resolution of the complaint shall be approved by the CPM.

Verification: Within five (5) days of completion of the above survey, the project owner shall submit the results of the survey to the CPM. Within five (5) days of the resolution of the complaint, the project owner shall submit a report to the CPM, showing compliance with the requirements of this condition of certification. If mitigation measures are necessary, this report shall include a description of those mitigation measure(s).

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Carrizo Energy Solar Farm Project (07-AFC-8)
NOISE COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date complaint received: _____ Time complaint received: _____
Nature of noise complaint: Weather-related conditions during the time noise was heard by the complainant:
Definition of problem after investigation by plant personnel: Date complainant first contacted: _____
Initial noise levels at 3 feet from noise source _____dBA Date: _____ Initial noise levels at complainant's property: _____dBA Date: _____ Final noise levels at 3 feet from noise source: _____dBA Date: _____ Final noise levels at complainant's property: _____dBA Date: _____
Description of corrective measures taken: Complainant's signature: _____ Date: _____
Approximate installed cost of corrective measures: $ _____ Date installation completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct: Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

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NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on a noise-sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (*Effects of Noise on People*, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (often used for an existing or pre-project noise condition for comparison study).
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: *Guidelines for the Preparation and Content of Noise Elements of the General Plan*, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: *Handbook of Noise Measurement*, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- subjective effects of annoyance, nuisance, dissatisfaction
- interference with activities such as speech, sleep, and learning
- physiological effects such as anxiety or hearing loss

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise to which one has become accustomed with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of 1 dB cannot be perceived.

2. Outside of the laboratory, a 3 dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10 dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., *The Effects of Noise on Man*, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by 6 dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *CARRIZO ENERGY SOLAR FARM PROJECT*

Docket No. 07-AFC-8

PROOF OF SERVICE
(Revised 6/5/2009)

APPLICANT

Sean Kiernan
Development Director
Ausra, Inc.
303 Ravendale Drive
Mountain View, CA 94043
sean.kiernan@ausra.com

APPLICANT CONSULTANT

Angela Leiba, GISP
Senior Project Manager
GIS Manager/Visual Resource Specialist
URS Corporation
1615 Murray Canyon Road, #1000
San Diego, CA 92108
angela_leiba@urscorp.com

Kristen E. Walker, J.D.
URS Corporation
1615 Murray Canyon Road, #1000
San Diego, California 92108
kristen_e_walker@urscorp.com

COUNSEL FOR APPLICANT

Jane E. Luckhardt
DOWNEY BRAND
621 Capitol Mall, 18th Floor
Sacramento, CA 95814
jluckhardt@downeybrand.com

INTERESTED AGENCIES

California ISO
e-recipient@caiso.com

San Luis Obispo County
John McKenzie
976 Osos Street, Rm 300
San Luis Obispo, CA 93408
jdmckenzie@co.slo.ca.us

INTERVENORS

Mr. John A. Ruskovich
13084 Soda Lake Road
Santa Margarita, California 93453
agarnett@tcsn.com

Mr. Michael Strobridge
9450 Pronghorn Plains Road
Santa Margarita, California 93453
mike_76@live.com

California Unions for Reliable Energy (CURE)
c/o Tanya Gulesserian
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
tgulesserian@adamsbroadwell.com

John Burch
Traditional Council Lead
Salinan Tribe
8315 Morro Road, #202
Atascadero, California 93422
salinantribe@aol.com

***Robin Bell**
Carrisa Alliance for Responsible Energy
P.O. Box 4280
Paso Robles, California 93447
robin@midstateexpo.com

Environmental Center of San Luis Obispo (ECOSLO)
c/o Babak Naficy
P.O. Box 13728
San Luis Obispo, California 93406
babaknaficy@sbcglobal.net

ENERGY COMMISSION

JEFFREY D. BYRON
Commissioner and Presiding Member
jbyron@energy.state.ca.us

JULIA LEVIN
Commissioner and Associate Member
jlevin@energy.state.ca.us

Gary Fay
Hearing Officer
Gfay@energy.state.ca.us

John Kessler
Project Manager
jkessler@energy.state.ca.us

Caryn Holmes
Staff Counsel
cholmes@energy.state.ca.us

Michael Doughton
Staff Counsel
mdoughto@energy.state.ca.us

Elena Miller
Public Adviser
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, Hilarie Anderson declare that on June 22, 2009, I served and filed copies of the attached Draft Noise & Vibration FSA Section The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[http://www.energy.ca.gov/sitingcases/carrizo/index.html]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(C*heck all that Apply*)

For service to all other parties:

_x_ sent electronically to all email addresses on the Proof of Service list;

_x_ by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

_x_ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below **(preferred method);**

OR

___depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-8
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

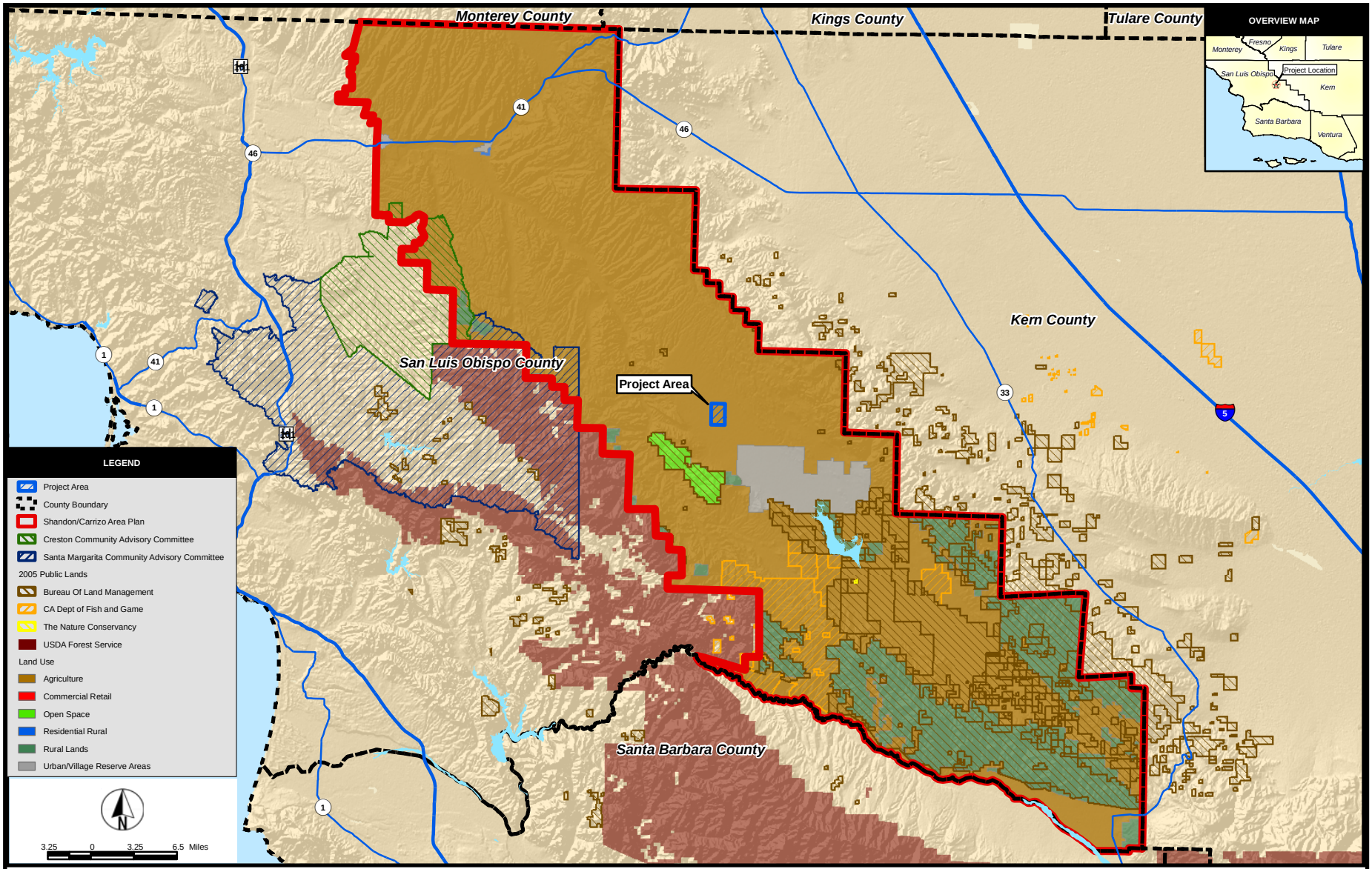
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original Signature in Dockets
Hilarie Anderson

NOISE AND VIBRATION - FIGURE 1

Carrizo Energy Solar Farm Project - Jurisdictional Boundaries and Land Uses Surrounding Carrizo Energy Solar Farm



SOURCES: ESRI (counties, shaded relief, roads); California Resources Agency (public lands 2005); Shandon-Carrizo-South Planning Area (area plan and land use).

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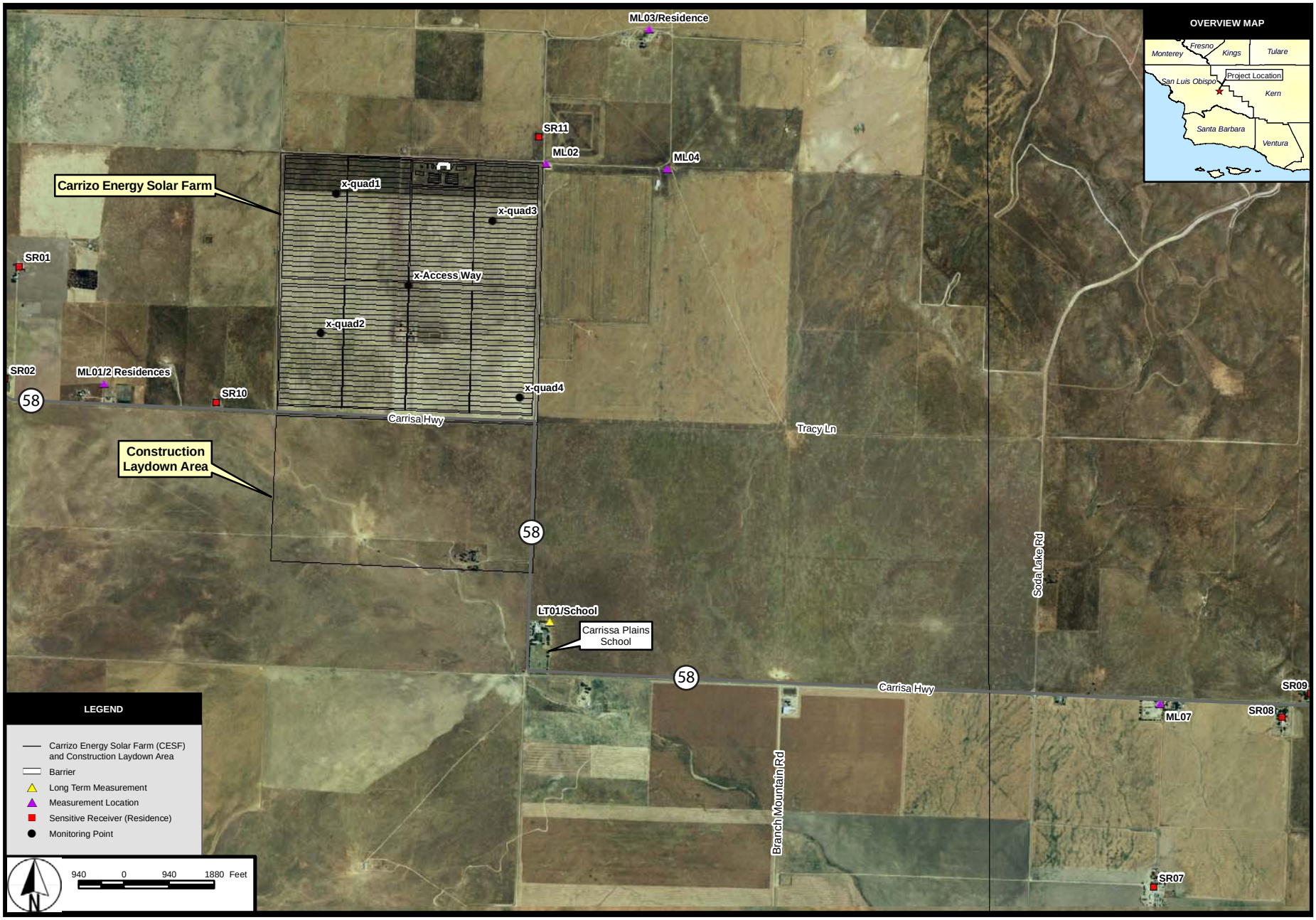
SOURCE: AFC Figure 5.9-1

NOISE AND VIBRATION - FIGURE 2

Carrizo Energy Solar Farm Project - Ambient Noise Monitoring Locations (Applicant Map)



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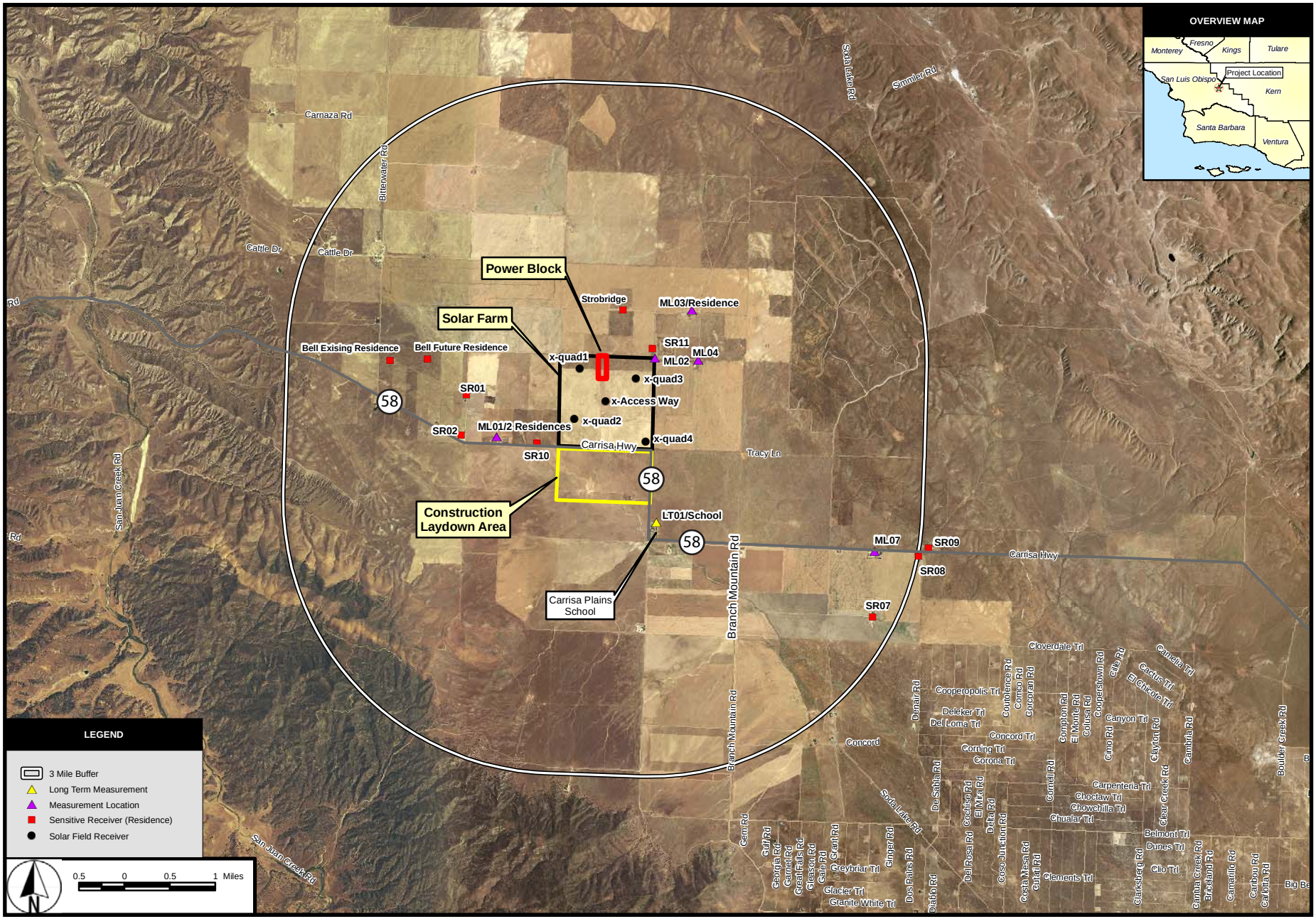
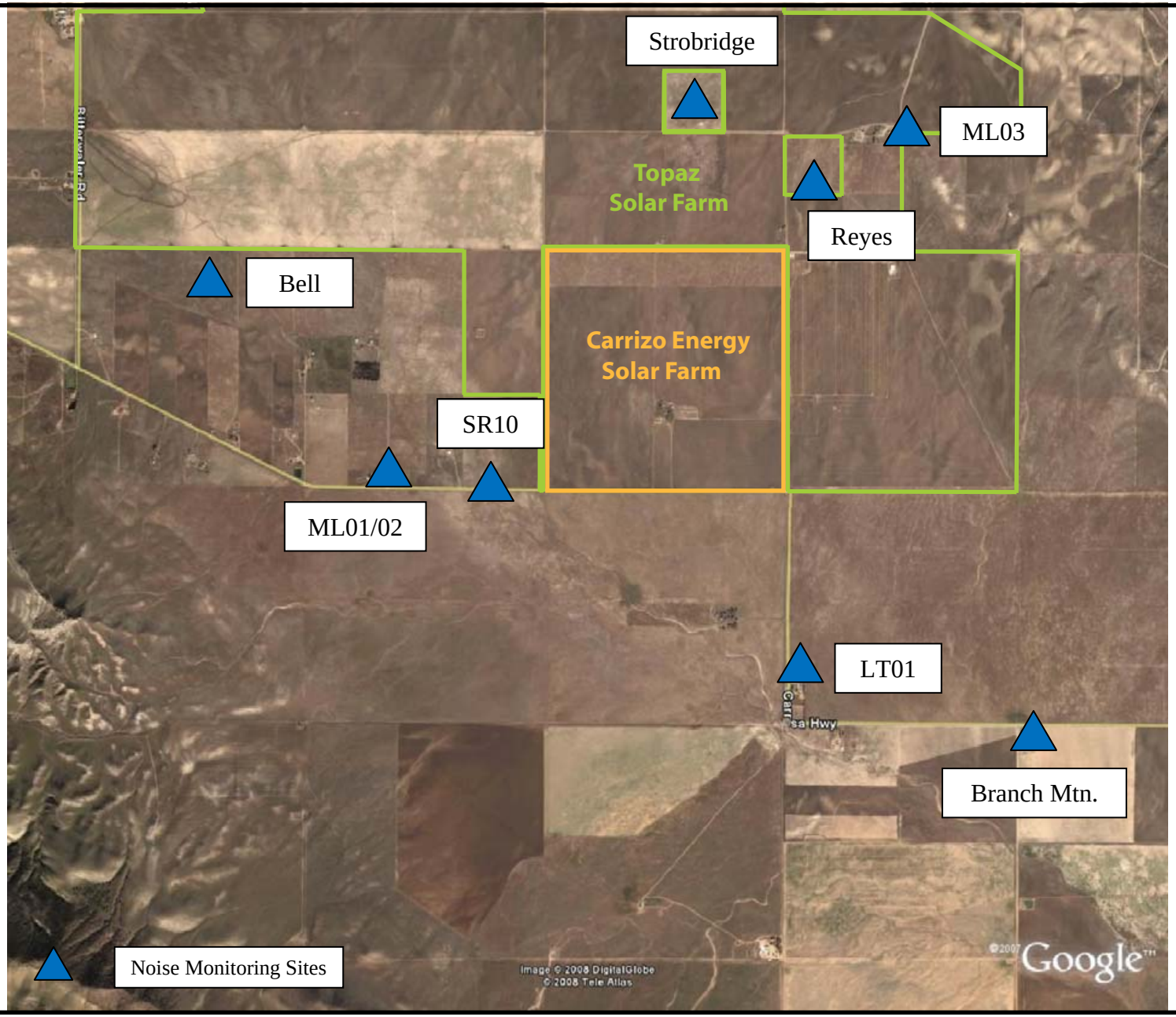
NOISE AND VIBRATION - FIGURE 3

Carrizo Energy Solar Farm Project - Ambient Noise Monitoring Locations (Applicant Map)



NOISE AND VIBRATION - FIGURE 4

Carrizo Energy Solar Farm Project - Ambient Noise Measurement Locations (Staff Map)



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SOURCE: CEC 2008ae - Figure1